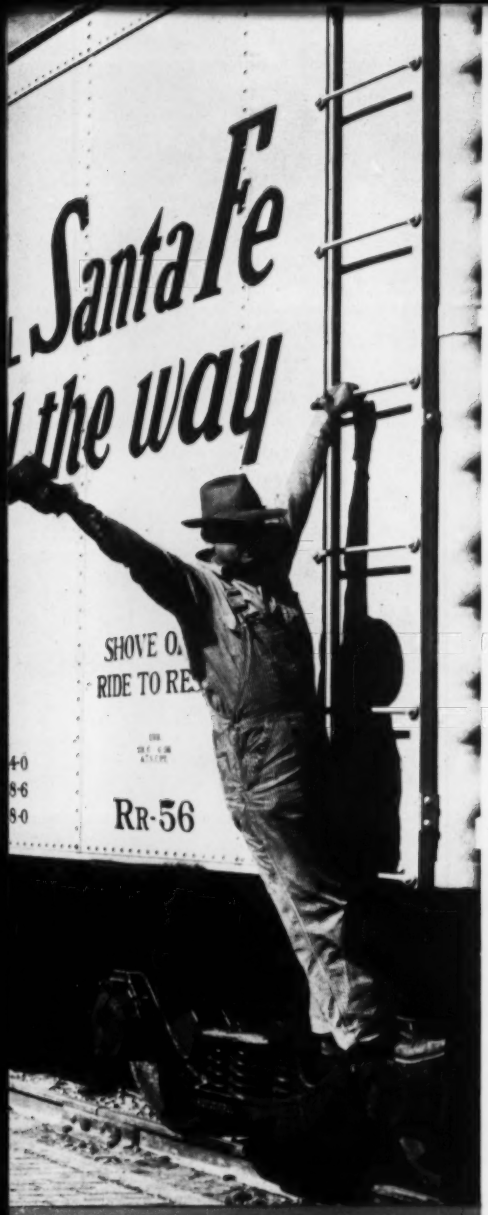
JANUARY 26, 1959

STEEL
The Metalworking Weekly

A PENTON PUBLICATION



Ailing Rails Ignore U. S. Aid

• Only five railroads have asked for government guarantees on borrowing which Congress approved last year to bolster the faltering industry. Now, after a year which saw new car deliveries fall by 50 per cent and rail ton-mileage dip 10 per cent, can the railroaders get more U. S. aid? Or is merger the only answer? . . . . Page 37

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Metalworking Makes Out Well In U. S. Budget for Fiscal '60

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Steel '59 Outlays: $1 Billion Plus

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Thin Refractory Shell Molds Boost Investment Casting

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Ceramic Mix Strengthens Metals

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How To Keep Work on Schedule

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Galvanizers Step Up Their Pace

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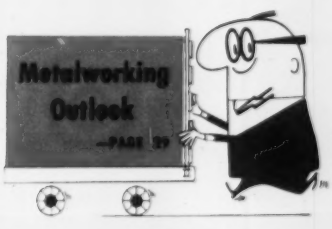
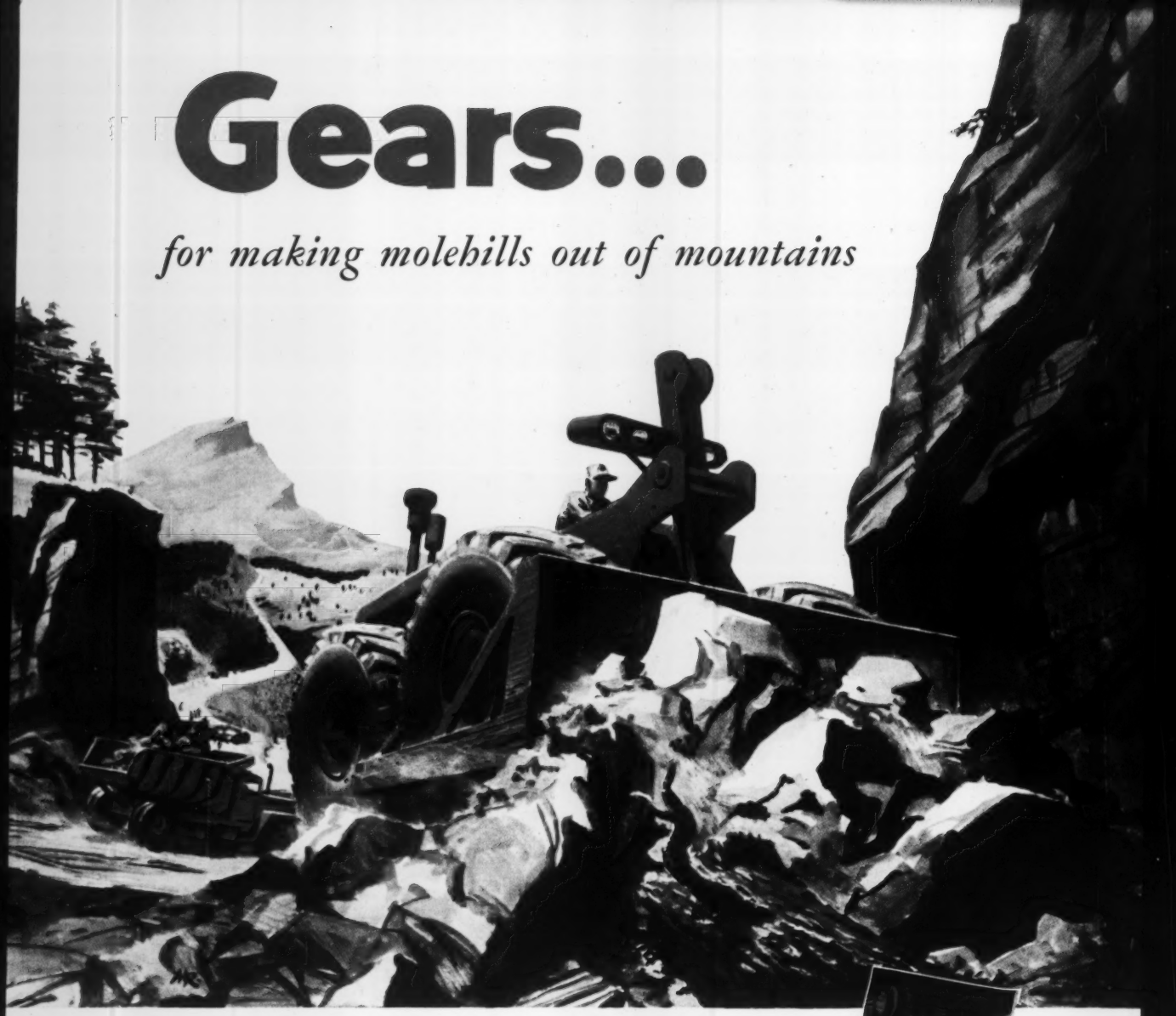


Gears...

for making molehills out of mountains



It is hard to imagine worse working conditions, and that is the very reason why the manufacturers of so many kinds of road building equipment install "Double Diamond" gears. Wherever the going is especially rough, wherever gears must give uninterrupted service on harsh, time-table schedules, you'll find our gears at work.

For low installed cost, for true operating economy and performance, and for buckling down to the hardest kind of service—nothing beats "Double Diamond."

Our salesmen are experienced gear engineers. Why not talk to one about your gear requirements?

May we send you a copy of this comprehensive catalog on the many gear types in which we specialize?

EATON

AUTOMOTIVE GEAR DIVISION
MANUFACTURING COMPANY
RICHMOND, INDIANA

GEARS FOR AUTOMOTIVE, FARM EQUIPMENT AND GENERAL INDUSTRIAL APPLICATIONS
GEAR-MAKERS TO LEADING MANUFACTURERS

The little booklet on alloy steels that grew into a textbook . . .

Quick Facts about Alloy Steels appeared for the first time in 1956, as a collection of reprints of a series of Bethlehem advertisements in metalworking magazines.

The small booklet was well received, and we kept adding more of the informative advertisements as we reprinted it to keep up with demand. Today, it has grown to 40-page size, and is in its Third Edition. More than 20,000 booklets have been distributed at the written request of executives, engineers, designers, and others, who have found *Quick Facts* to be an authoritative small textbook on the fundamentals of alloy steels. Here's what a U. S. Navy engineer wrote:

"*Quick Facts* is a small textbook of information—a booklet that has been needed for a long time. One of my associates and I had a metallurgical problem involving alloy steels. We just didn't have the information. A friend showed me a copy of your booklet *Quick Facts,* and there on one page, under the subject 'Determining Depth Hardness,' was just what we wanted to know!"

The current booklet contains reprints of the complete series of advertisements, on such subjects as, "What is an Alloy Steel?" "Effects of Elements," "Grain Size," "Heat-treatment," "Quenching Media," and others. It's written in concise, layman's language, from data compiled by Bethlehem's metallurgical engineers.

Would you like a copy of the *Quick Facts* booklet? Just fill out and send in the coupon.

PUBLICATIONS DEPARTMENT, ROOM 1030
BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

Please send me your "Quick Facts about Alloy Steels" booklet.

NAME_____

COMPANY_____

ADDRESS_____

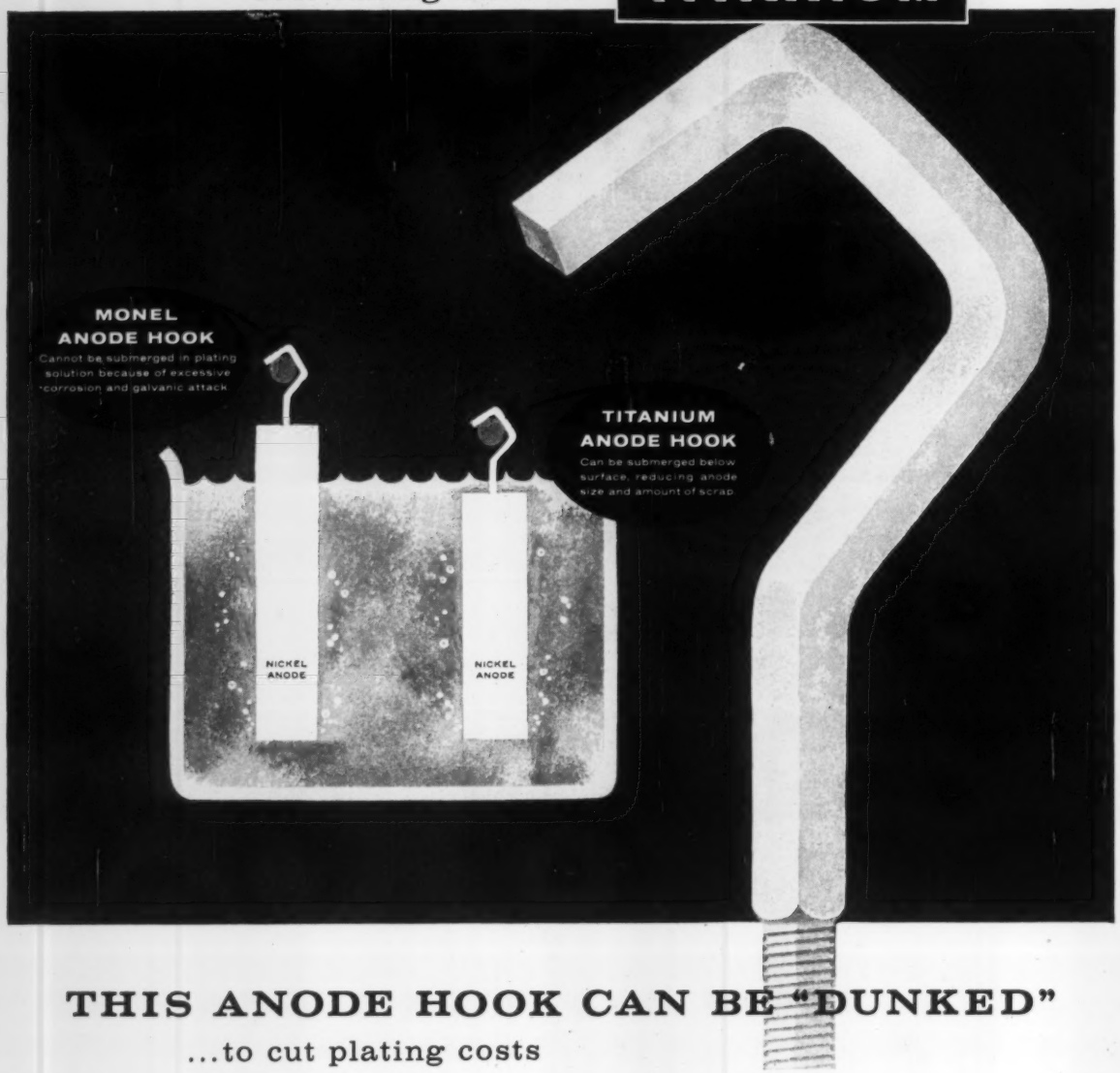
CITY_____ STATE_____

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA. On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

Cost cutting ideas in **TITANIUM**


MONEL
ANODE HOOK
Cannot be submerged in plating solution because of excessive corrosion and galvanic attack
TITANIUM
ANODE HOOK
Can be submerged below surface, reducing anode size and amount of scrap
NICKEL ANODE
NICKEL ANODE

THIS ANODE HOOK CAN BE "DUNKED"

...to cut plating costs

IF YOU'RE PLATING PARTS with nickel, chromium or copper, here's a cost-cutting idea worth investigating.

The titanium anode hook illustrated above offers important advantages in highly corrosive plating applications. For example, because of titanium's extreme resistance to corrosion, the bare hook can be "dunked" in nickel plating solutions. This means you use up practically *all* of the anode—reducing costly scrap waste. In addition, the titanium hook lasts indefinitely.

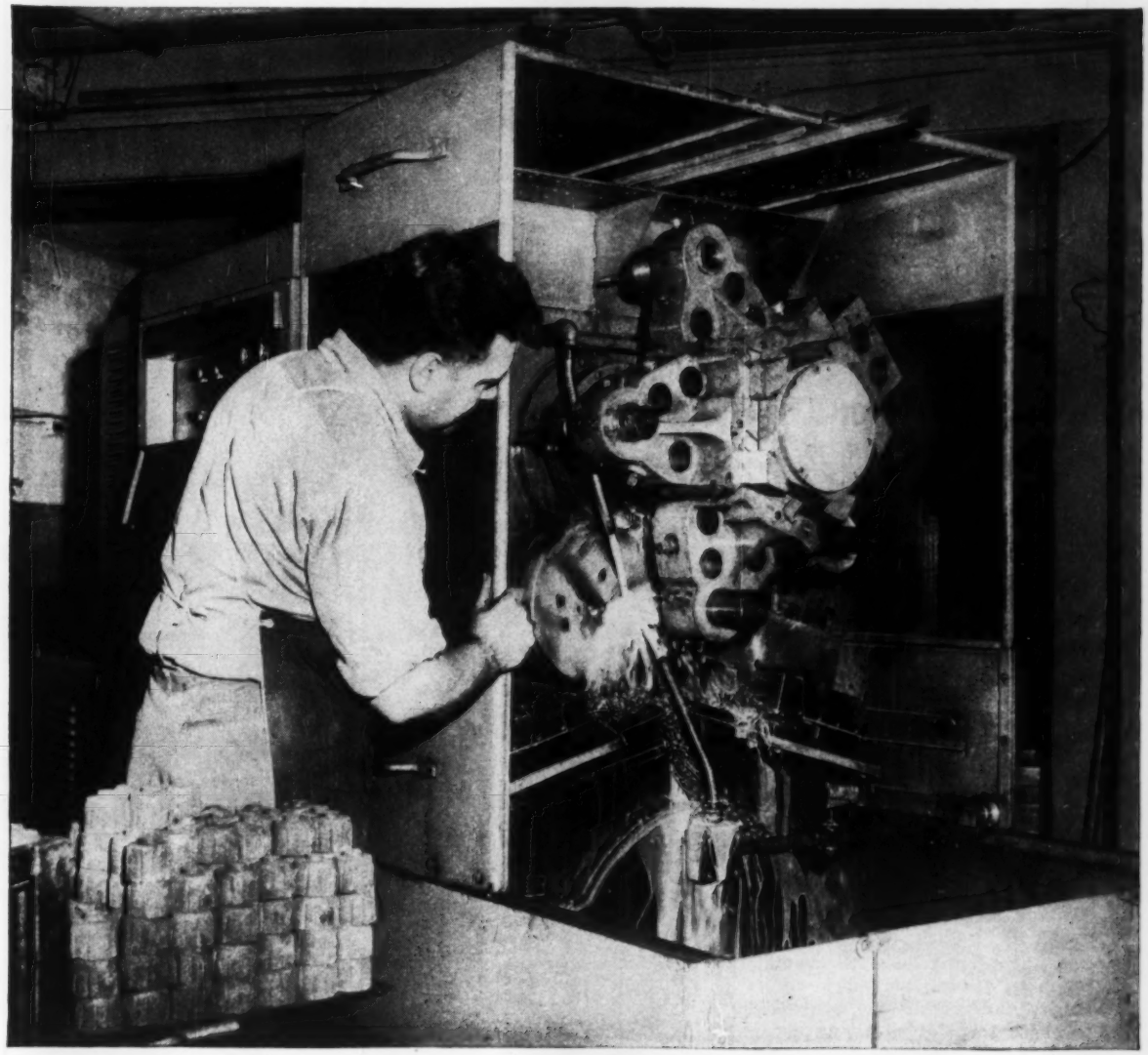
Titanium hooks, anode baskets and heating coils are now cutting costs in a number of large-scale plating applications... examples of how Mallory-Sharon's development work in titanium is paying off for industry.

Write for Technical Data Sheet and application information on titanium anode hooks, or any other high-corrosion problems you may have. Please address: Commercial Market Development, Dept. A, Mallory-Sharon Metals Corp., Niles, Ohio.

MALLORY MS SHARON

MALLORY-SHARON METALS CORPORATION • NILES, OHIO

Integrated producer of Titanium • Zirconium • Special Metals



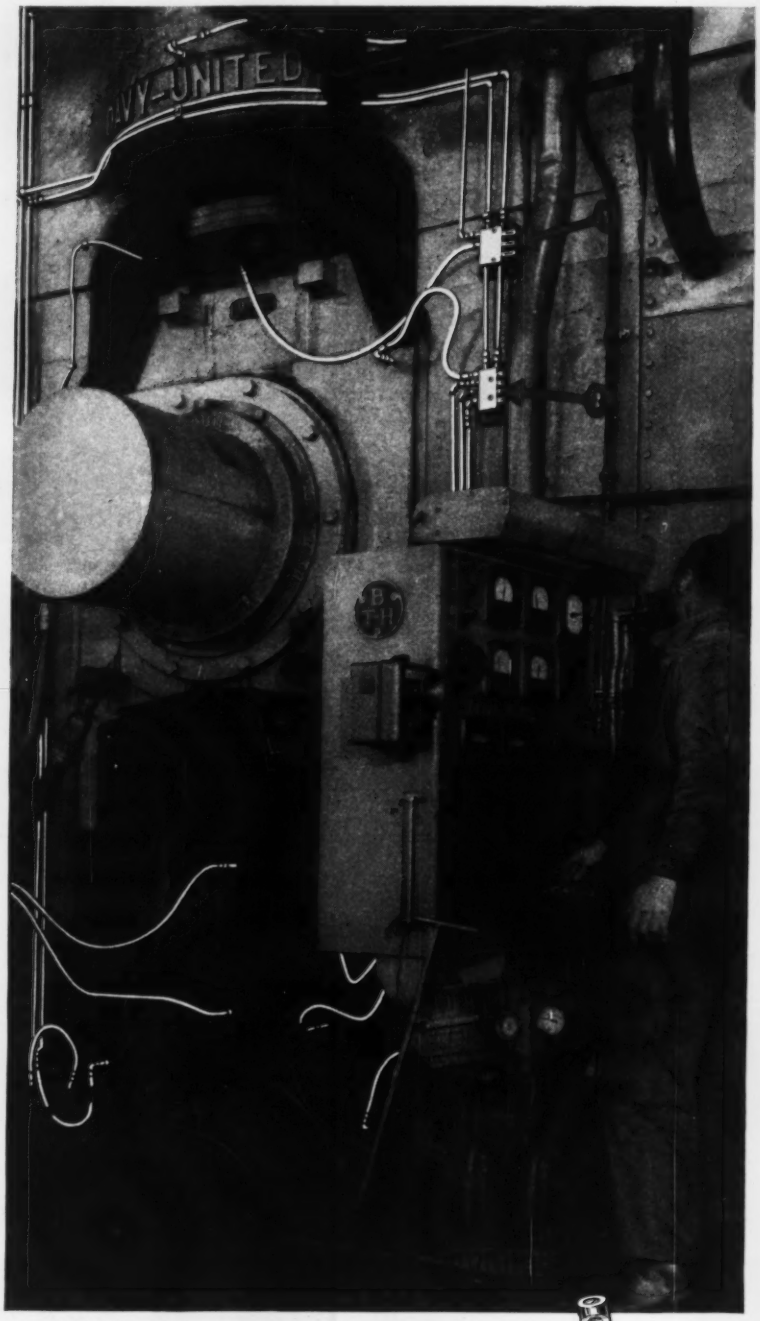
At Thew Shovel...

This Warner & Swasey Single Spindle Chucking Automatic paid for itself with one year's savings! It machined both cast and forged steel parts for Lorain power shovels and cranes.

WARNER & SWASEY
Cleveland
PRECISION MACHINERY SINCE 1880

YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS.... WITH A WARNER & SWASEY

Farval
lubrication systems serve 600 points on Australian steel mill



Modern Farval lubrication systems help maintain high-production rates on this 1200 fpm cold reduction mill in the Port Kembla, Australia, facilities of Lysaghts Works, Ltd. They dependably provide around-the-clock lubrication at regular intervals to 260 bearings on this recently installed mill.

Automatic systems serve bearing housing slides and screw-downs every two hours and work roll bearings every half-hour. Manual systems, operated at the start of each shift, require only five minutes' time. Additionally, 340 other lubrication points on metalworking machinery in this plant are served by Farval systems.

Whatever the country, wherever steel is being made or worked, you're sure to find Farval lubrication systems protecting bearing life of metalworking machines.

To see how correct lubrication can cut labor costs and reduce downtime in your own operations, ask for revised Bulletin 26-S. Write today to The Farval Corporation, 3270 East 80th Street, Cleveland 4, Ohio.

FARVAL—Studies in Centralized Lubrication No. 223

KEYS TO ADEQUATE LUBRICATION

Wherever you see the sign of Farval—familiar valve manifolds, dual lubricant lines and central pumping station—you know a machine is being properly lubricated.

Affiliate of The Cleveland Worm & Gear Company, Industrial Worm Gearing. In Canada: Peacock Brothers Limited.

This Week in STEEL The Metalworking Weekly

January 26, 1959
Vol. 144 No. 4

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Does your company have more people than it needs? Perhaps you should check for deadwood.

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Self-help is contemplated by the ailing railroad industry, but it will ask Congress at this session to refill its prescription. Only a few roads have taken advantage of remedies prescribed by Congress last year.

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STEEL, the metalworking weekly, is selectively distributed without charge to qualified management personnel with administrative, production, engineering, or purchasing functions in U. S. metalworking plants employing 20 or more. Those unable to qualify, or those wishing home delivered copies, may purchase copies at these rates: U. S. and possessions and Canada, $10 a year; all other countries, $20 a year; single copies, 50 cents. Metalworking Yearbook issue, $2. Published every Monday and copyright 1959 by The Penton Publishing Co., Penton Bldg., Cleveland 13, Ohio. Accepted as controlled circulation publication at Cleveland, Ohio.

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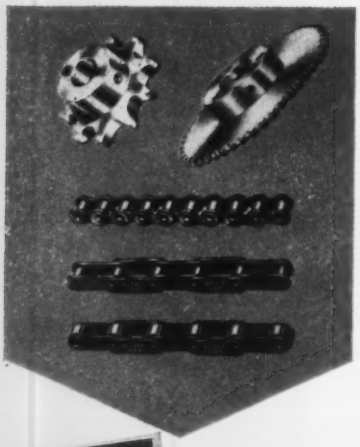
7 BIG WAYS
when you call your
INDUSTRIAL
DISTRIBUTOR
For ACME
Roller Chains and Sprockets

★ Keeps machine down-time to a minimum.
★ Saves you keeping large parts inventory.
★ You get speedier parts delivery.
★ You get quick, close-by advice and service.
★ Saves on other paper work, such as extra requisitions, etc.
★ Saves on correspondence.
★ Simplifies purchasing.



Write Dept.10-E for new 100-page Illustrated Catalog, including new engineering section showing diagrams of 36 methods of chain driving.

Acme Chain Corporation
HOLYOKE MASSACHUSETTS

behind the scenes

Oriental Post

Oh, East is East and West is West,
But letters passed betwixt 'em
Suggest the Japs took turkey tracks
And cutely intermixed 'em!

The foregoing notion may have occurred to V. H. McClure, president of W. S. Hill Co., when he received a letter in Japanese from Mesta Machine Co., Pittsburgh. Mesta didn't write the letter of course; it came from Yataro Nishiyama, director and president of the Kawasaki Steel Corp., Kobe, Japan. Mr. Nishiyama wrote to Mesta to express his appreciation for the assistance it extended to him during the construction of a strip mill plant at the Chiba Iron & Steel Works.

Mesta passed the letter to its advertising agency, the W. S. Hill Co.; the agency routed it to Mr. McClure, who sent it to STEEL's editor-in-chief, Irwin H. Such, who acknowledged it and passed it to Editor Walt Campbell.

"I'll pass it to that old goat Shrdlu!" Campbell chuckled. "He seems to fancy himself as a translator of pre-Columbian Iroquois and current Bebop; let's see what he can do with Japanese!"

A simple chore, sir. The letter says:

感謝狀

Nov. 8, 1958

Messrs. Mesta Machine Co.
Pittsburgh 30, Pa., U. S. A.
Gentlemen:

Throughout the entire period of construction of the strip mill plant at the Chiba Iron & Steel Works, your unstinted work and co-operation in manufacturing the necessary machines and equipment, combined with careful planning and superior engineering, have made possible this magnificent achievement.

We are happy, on the occasion of the inauguration of the strip mill plant, therefore, to take this opportunity of expressing our sincere appreciation for the outstanding co-operation that you have extended to us.

Very truly yours,
Yataro Nishiyama
Director & President
Kawasaki Steel Corp.
Kobe, Japan

(Copy editor's note: An English translation was attached to Mr. Nishiyama's letter, and we think we know who stole it. Shrdlu doesn't understand Japanese. Judging from the mistakes he repeats, we don't think he even understands English.)

Why Daisies Won't Tell

While we're on the subject of letters, a most delightful communication from Mary Kay Smith last week rolled back the winter fog. Mary Kay is an engineering assistant at the tubing plant of Armco Steel Corp., Piqua, Ohio, and she has a startling suggestion to make to the ad men who prepared the Eli Lilly ad (STEEL, Jan. 12, p. 58).

"No one, BUT NO ONE," wrote Mary Kay, "would have that rhapsodical expression on his face whilst (don't you love that word; I borrowed it from an English friend who lives on the Welsh border) sniffing a daisy. They STINK! I doubt if pseudomonads in cutting oils smell any worse. I realize the idea was based on the phrase 'Fresh as a daisy,' but since they're making it an aesthetical reaction, why didn't they let the poor machinist smell a lily, or a rose?"

Ah, Mary Kay, if the advertising people want that poor machinist to wear a rhapsodical expression, sure they could accomplish their aim simply by introducing him to your charming self, and let the daisies go hang—say on the Welsh border line.

1730 Experts

Late in 1958 Detroit Editor Don Postma invited STEEL's readers to beat the experts in calling the correct automobile production figures covering the first half of 1959. Prizes included desk model cars and reproductions of a drawing by George Walker, styling vice president, Ford Motor Co. The contest closed at midnight, Dec. 31, 1958, but before the clock boomed its fateful 11 notes, (it was slow) 1730 entries were received in good order. They came in at the rate of 30 a day, with a surge of 251 in the course of the last three days. Winners cannot be determined before the end of June, 1959, so we submit that our contestants bow to none in the matter of patience. We aim to dip into this mass of comment from time to time, so watch this space for instructive public comment on the automobile business.

Shrdlu

(Metalworking Outlook—Page 29)

Lifting heavy beams for steel-skeletoned skyscrapers, over the heads of pedestrian and vehicular traffic, calls for careful loading — with safe slings, stout wire rope and a crane that's securely guyed with steel cables. Structural steelworkers practice safety because they know that...

life depends on it

Today, taller buildings, bigger bridges, deeper oil wells, greater construction projects require stronger, safer wire rope. And equipment operators know that when you buy "bargain" rope you're heading for headaches, trouble and expense. So don't bargain with safety. Buy wire rope on the basis of *quality*. Buy Wickwire Rope.

WICKWIRE ROPE — A CF&I PRODUCT

CF&I

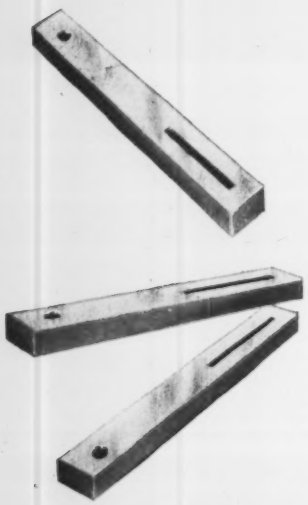
5696

PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

THE COLORADO FUEL AND IRON CORPORATION—Albuquerque • Amarillo • Billings • Boise • Butte • Denver El Paso • Farmington (N. M.) • Fort Worth • Houston • Kansas City • Lincoln (Neb.) • Odessa (Tex.) • Oklahoma City Phoenix • Pueblo • Salt Lake City • Tulsa • Wichita • **PACIFIC COAST DIVISION**—Los Angeles • Oakland • Portland San Francisco • San Leandro • Seattle • Spokane • **WICKWIRE SPENCER STEEL DIVISION**—Boston • Buffalo • Chattanooga Chicago • Detroit • Emlenton (Pa.) • New Orleans • New York • Philadelphia

LOOK FOR THE **YELLOW** *TRIANGLE*

NEW LOOK IN PRODUCTION LINES



From Material to Product in ONE PACKAGE

Need help to reduce your manufacturing costs and raise your production? Why not check Federal/Warco Packaged Production Lines — automated production from coil strip or sheet blanks to finished product.

Only Federal can offer you actual single source responsibility with major line components of resistance welders, punch presses, mechanical welder presses, automatic arc welders, expanders, destackers, transfer equipment and digital control — all designed and built in Federal's plants.

Federal pioneered and are leading designers and builders of packaged lines. Talk with a Federal representative when next you're planning production welding or press equipment.

Federal / Warco
PACKAGED
PRODUCTION LINES

THE FEDERAL MACHINE AND WELDER COMPANY - WARREN, OHIO

AFFILIATED WITH BERKELEY-DAVIS, INC., DANVILLE, ILLINOIS, MANUFACTURERS OF AUTOMATIC ARC WELDING EQUIPMENT.

for every wheel that turns in industry

Lubricating oils, cutting oils, multi-purpose greases, greases for spraying . . . whatever your needs, Atlantic has the lubricant to help you. Atlantic lubricants insure maximum lubricating performance at low cost for every job in the plant . . . for every wheel that turns in industry.

For lubricating products that fit your specific needs, or for expert assistance with your lubricating problems, write or wire any of these Atlantic offices.

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260 South Broad Street

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Reading, Pa.
First and Penn Aves.

Charlotte, N. C.
1112 South Boulevard

Pittsburgh, Pa.
Chamber of Commerce Building

Syracuse, N. Y.
Salina and Genesee Sts.

Atlantic Refining Co. of Brazil Rio de Janeiro, Brazil

ATLANTIC

LUBRICANTS · WAXES
PROCESS PRODUCTS

NEW!

2½-lb. Pressurized Dry Chemical

5-lb. Pressurized Dry Chemical

Kidde dry chemicals kill more fire faster!

Granted top rating by Underwriters' Laboratories, these two new Kidde dry chemical extinguishers pack the *extra* punch you need to knock out stubborn blazes. These 2½- and 5-pound Kidde units put out as much fire as eight and sixteen one quart carbon tetrachloride portables respectively. They are perfectly balanced for fast action, are light in weight, easy to operate even while wearing gloves. And – no pin to remove, no valves to turn, no inverting or bumping needed. Just aim at fire and press the lever! Pressurized, they can be easily and quickly recharged with air or nitrogen. No pressure cartridge needed. Write for more information on these new Kidde extinguishers – easiest-to-operate of all dry chemical portables.

Kidde (K Kidde)

Walter Kidde & Company, Inc.
160 Main St., Belleville 9, N. J.

Walter Kidde & Company of Canada Ltd.
Montreal—Toronto—Vancouver

VISIT KIDDE BOOTHS 1510-12 AT THE CLEVELAND PLANT MAINTENANCE SHOW, JANUARY 26-29

LETTERS
TO THE EDITORS

Praises Yearbook Issue

Congratulations on the Jan. 5 issue of STEEL. It is one of the best looking and most comprehensive annual review issues I have ever seen, and it is certainly a credit to the entire staff. It seems to me the material in this issue should be invaluable to any member of the industry.

May I pose a thought for next year's annual issue? I think a small section devoted to secondary nonferrous metals might not be amiss. I know that members of our industry read STEEL, and I am certain they would welcome some space devoted to secondary metals.

Si Wakesberg
Secretary
Metal Dealers Div.
Secondary Metal Institute
National Association of Waste Material Dealers Inc.
New York

Important to All Supervisors

I would like to get reprints of the excellent article, "The Changing Role of Metalworking Managers" (Jan. 5, p. 92).

The Coal Traffic & Development Dept. of our railroad is holding a staff meeting at which time I should like to see that each of the 80 members gets a copy of the article.

Although specifically your message has been directed to metalworking managers, the principles contained in the article are so important to anyone in a supervisory capacity, I am sure our people would benefit.

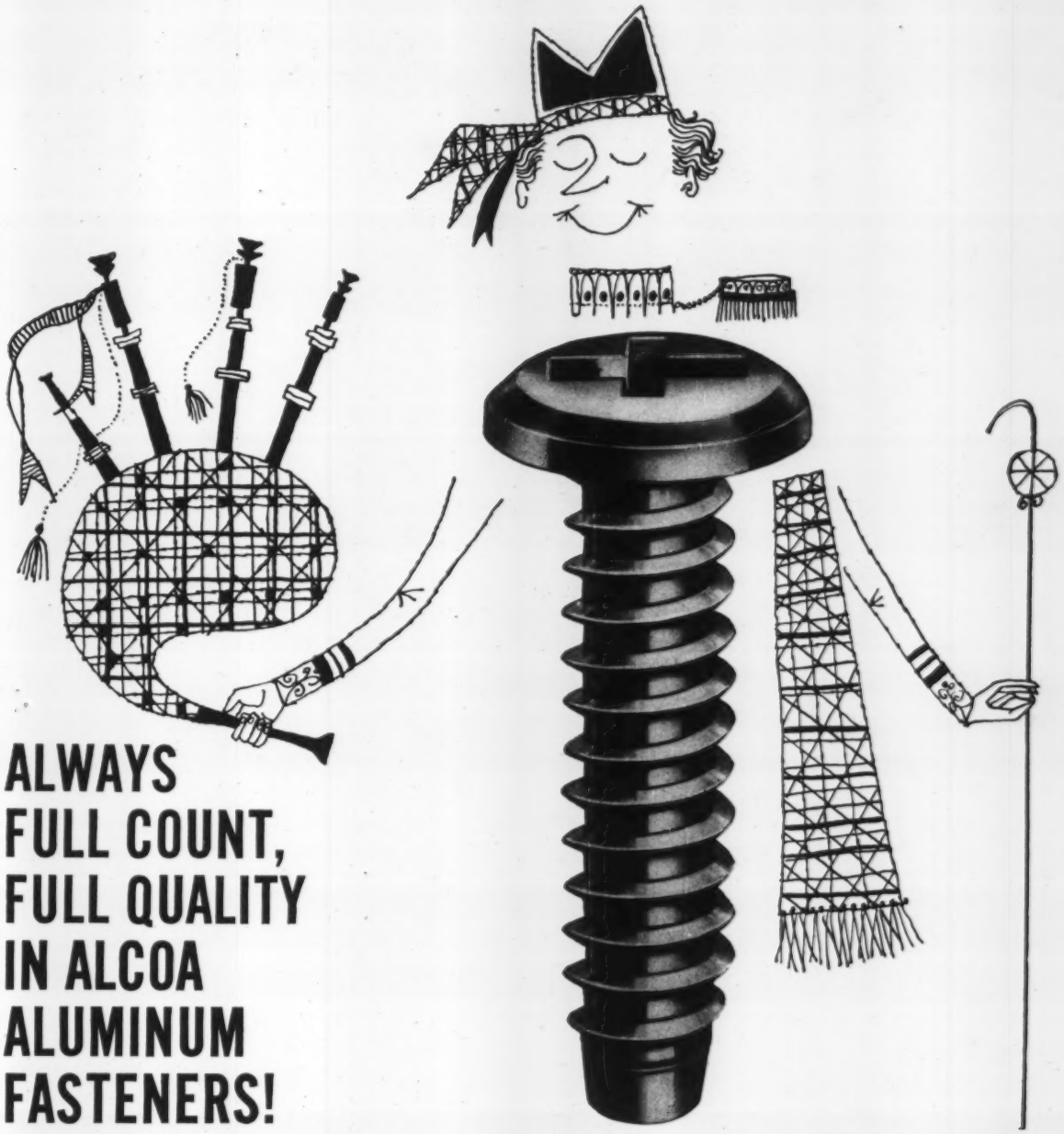
Royal C. Reidinger
General Coal Traffic Manager
Chesapeake & Ohio Railway Co.
Cleveland

Corrects STEEL's Misquotation

The interesting and complete Jan. 5 issue of STEEL arrived today. As usual, STEEL has done an outstanding job of accumulating a wealth of information which will be of extreme value to the industry during the year to come.

We are concerned, however, with Frank Cashin's quote (pp. 192-193) which is di-

(Please turn to Page 12)



ALWAYS FULL COUNT, FULL QUALITY IN ALCOA ALUMINUM FASTENERS!

YOU'LL FIND 144 or more *perfect* fasteners in *every* gross box when you order from your local Alcoa Distributor. On bulk items, too, you'll receive the number of pieces ordered. And there'll be no rejects, no misfits, no "seconds" . . . whether you buy a hatful or a carload!

And, of course, Alcoa® Aluminum Fasteners give you maximum protection against corrosion. Their bright, flawless finish adds extra sales appeal to your product at the time of purchase—and won't stain or mar it at any time *after* purchase.

Your Alcoa Distributor carries *complete* stocks of all standard types and sizes, locally—for really prompt filling of your orders. You'll find him in the Yellow Pages of your phone book. Why not give him a call right now? Or, if you'd like additional facts and a few samples, just mail the coupon!

Your Guide to the Best in Aluminum Value

ALCOA ALUMINUM

For Exciting Drama Watch **"Alcoa Theatre,"** Alternate Mondays, **NBC-TV** and **"Alcoa Presents,"** Every Tuesday, **ABC-TV**

FREE . . . FACTS, SAMPLES FREE . . . FACTS

Aluminum Company of America
2005-A Alcoa Bldg., Pittsburgh 19, Pa.

Gentlemen: Please send complete specification data and samples of Alcoa Aluminum Fasteners.

Name_____

Title_____

Company_____

Address_____

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NOW...
select from a complete range of capacities and speeds...1/8 to 2 tons and 8 to 60 fpm.

important new models of the Lodestar® electric hoist

NEW MODELS in 1/2, 1 and 2 tons

LODESTAR FEATURES INCLUDE:

- Safe, Heavy Duty Performance
- Lowest Headroom
- Push Button Control
- Fully Enclosed Components
- Self-Adjusting Magnetic Brake
- Ultra-Modern Electric Braking
- CM-ALLOY Flexible Link Chain
- Minimum-Maintenance Operation
- Lifetime Lubrication

Request catalog and name of local stocking distributor.

LARGER CAPACITY and FASTER SPEEDS
...for speedier, lower cost materials handling

● Here's your opportunity to slash lifting and handling costs. Put these new Lodestars to work where their increased speeds and capacity match your maximum requirements. Many thousands already in service demonstrate that you, too, can benefit from more efficient handling, lowered costs and increased productivity.

CM HOISTS

CHISHOLM-MOORE HOIST DIVISION
Columbus McKinnon Chain Corporation
TONAWANDA, N.Y.
NEW YORK • CHICAGO • CLEVELAND
In Canada: McKinnon Columbus Chain Ltd., St. Catharines, Ont.

LETTERS

(Concluded from Page 10)

rectly opposite to what Mr. Cashin said. His actual statement reads: "There are experts in the steel industry who confidently expect that by 1965 the basic oxygen process will represent about 20 per cent of the industry's productive capacity. Therefore, we can expect to see the same type of improvement in refractories for use in this process as we have seen in the open hearth."

We will appreciate it if you will inform your readers.

David S. Way
Public Relations
Chemicals Div.
Kaiser Aluminum & Chemical Corp.
Oakland, Calif.

Compares Forecasting

"Steel Inventory Trend Line To Climb Steadily in '59" (Dec. 1, 1958, p. 37) was extremely interesting to our department. Since Granite City Steel does its own forecasting, it gave us the opportunity to compare our thinking with that of others.

We would like one point clarified: Were the inventory figures given on a finished steel basis or an ingot equivalent of the finished steel?

James M. Mosby
Analytical Department
Granite City Steel Co.
Granite City, Ill.

● *The steel inventory figures refer to finished steel.*

'58 Series To Complement '57's

I would greatly appreciate obtaining a reprint of each of the 1958 Management Series articles.

I want them to complement my file of the 1957 Series which I find are unique in their clarity and perspective.

R. L. Wray
Design Engineering
General Electric Co.
Asheboro, N. C.

Requests Articles for Managers

I would like six copies each of your two fine articles, "The Changing Role of Metalworking Managers" (Jan. 5, p. 95) and "9.2% More Sales in 1959" (Jan. 5, p. 99). I want to pass them along to our six managers.

G. A. Mathis
President
New York Blower Co.
LaPorte, Ind.

Receives Inquiries from Article

We note with interest "Quick Finishing at Low Cost" (Dec. 15, 1958, p. 150) and wish to thank you for including our Mechamactic method. We have already received two inquiries. May we have an extra copy of this article?

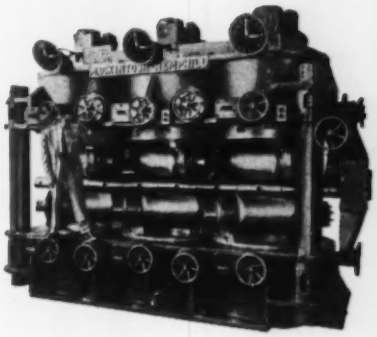
D. G. Hopkins
President
Mecha-Finish Corp.
Sturgis, Mich.

...ALL SIZES STRAIGHTENED AND PERFECTLY ROUNDED ON MACK-HEMP ROTARY TUBE STRAIGHTENERS

Tubes of any alloy in any O.D. from .050-inch to 16 inches are production straightened and rounded at speeds up to 800 feet per minute or better. The six driven rolls are fully adjustable to suit tube diameter, amount of straightening bend needed, and correct contact grip on the tube. The machine operates without speed-limiting, surface-marring guides and the finished tubing shows no spiral markings.

All models—from the smallest to the largest—are now available in Mack-Hemp's exclusive new three-post construction.

For complete details of Mack-Hemp straighteners, write today for a free copy of our 24-page Technical Bulletin No. 55-A, "How to Straighten Pipe and Tube".



MACKINTOSH-HEMPHILL Division of E. W. BLISS Company

901 Bingham Street, Pittsburgh 3, Pa.

Makers of the rolls with the Striped Red Wabblers

New "Comapro" project cuts machining time up to 30%...

GULF MAKES THINGS

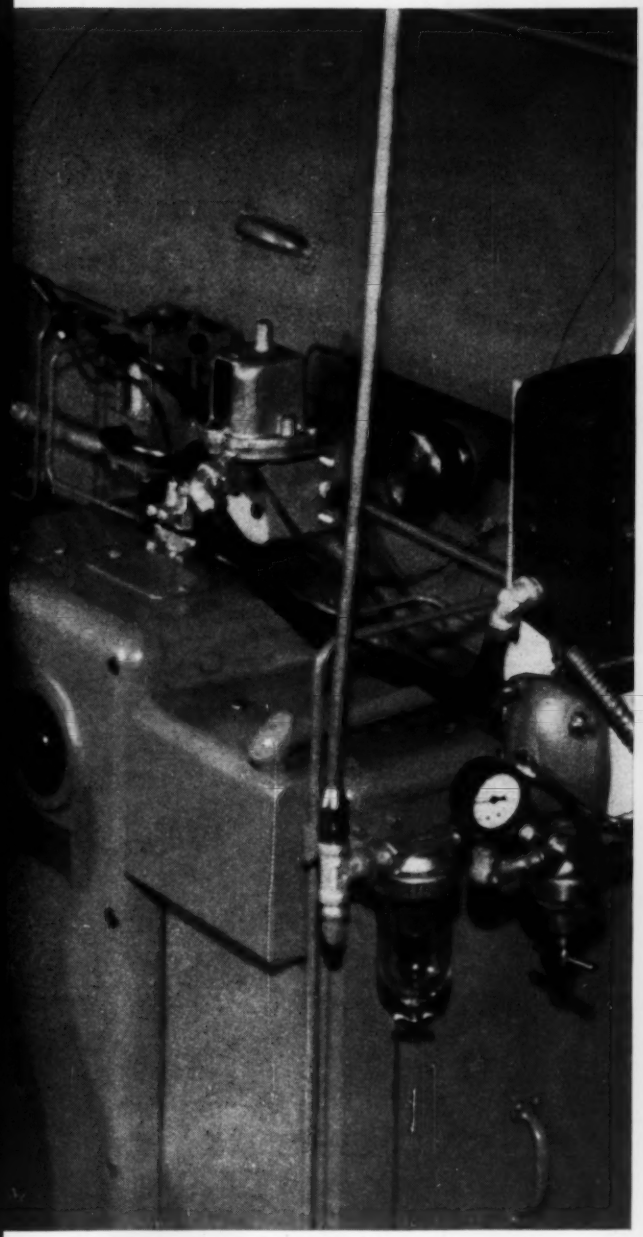
Only five months under way, the Cooperative Machining Project known as "Comapro" has already developed unusual time-saving and cost-cutting machining practices, using Gulfcut Cutting Oils.

A case in point is the machining of a simulated spark plug shell at the COMAPRO Department of one of the participating manufacturers—Cone Automatic Machine Company, Windsor, Vermont.

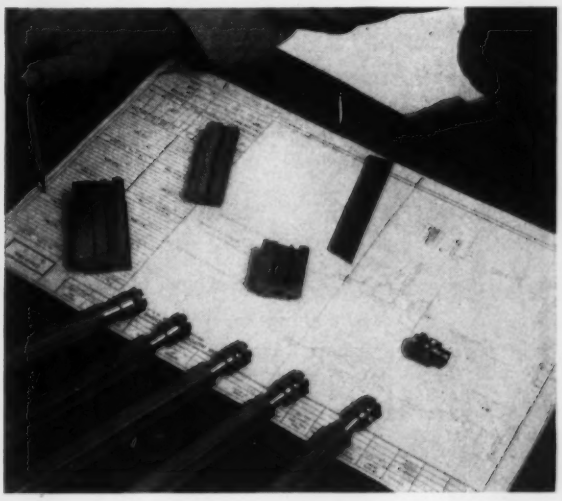
Using Gulfcut Cutting Oil in a Conomatic bar machine, they're running this spark plug part in 4.4 seconds, compared to an industry average of 6 seconds. A 30% saving in machining time!

This is right in line with the over-all objective of "Comapro"—to develop more efficient ways to cut the cost-per-part figures in a wide variety of machining jobs, particularly in mass production. Findings will be made available to the entire metalworking industry.

As a co-sponsor of "Comapro," Gulf supplies all the



Lower cost per piece—on a great variety of machined parts—is the main goal of the "Comapro" cooperative cost-research program. For complete information on the latest findings of the project, write to COMAPRO, c/o Cone Automatic Machine Company, Windsor, Vermont.



This Conomatic automatic bar machine is a pilot unit in the "Comapro" research project. Gulfcut Heavy Duty Soluble Oil helps it operate at maximum output, to determine best machining practice at lowest cost per part.

and proves again

RUN BETTER!

cutting oils for the project, from the complete Gulfcu line—plus Gulf greases and machine lubricants. Under closely controlled research conditions, the proof is piling up that Gulf makes things run better!

Let us help you put "Comapro" findings to work in *your* production—and show you how Gulf makes things run better in your plant, operation-wise and cost-wise. For complete information, call a Gulf Sales Engineer at the nearest Gulf office.

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Dept. DM, Gulf Building
Pittsburgh 30, Pennsylvania

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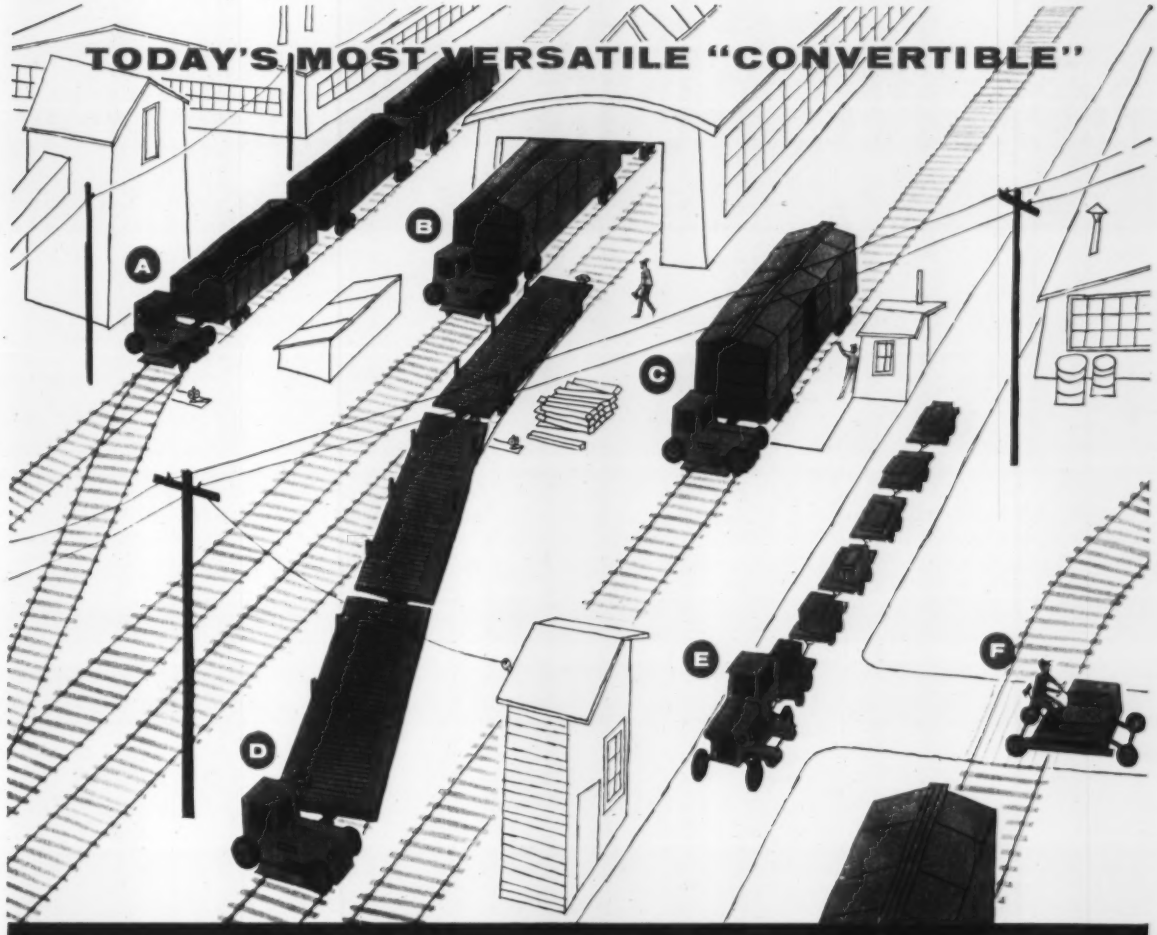

3 Models to Meet Your Specific Needs

2TM Trackmobile

3TM Trackmobile

5TM Trackmobile

All three models of the Whiting Trackmobile switch, spot and haul freight cars fast and at low cost. Trackmobile converts from road to rail in seconds to facilitate car handling, makes your operation more profitable. Here are just a few of the many ways you might use "Today's Most Versatile Convertible":

- **A** New 5TM torque converter Trackmobile quickly switches fully-loaded coal cars.
- **D** Railroads are big Trackmobile boosters—use them to shuttle cars in and out of repair shop.
- **C** 3TM Trackmobile is on the job rain or shine. Here it spots a freight car with pin-point precision.
- **D** 3TM Trackmobile returns empties or loaded cars to siding, positions cars where they're needed, frees plant from dependence on switch engines.
- **E** No freight cars to move at the moment, so 5TM converts to road wheels to haul carts.
- **F** Trackmobile can travel "cross-country" on rubber tires to where it's needed. Now this 2TM will convert to steel rail wheels in seconds.

SEND FOR TRACKMOBILE FACT FILE—Illustrated folders on all three Trackmobile models. See which one meets your needs best. Whiting Corporation, 15643 Lathrop Avenue, Harvey, Illinois.

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Republic ELECTRUNITE Mechanical Tubing

...facilities and abilities save production time, materials, costs!

This story is a typical example of how Republic's ELECTRUNITE® Mechanical Tubing—in rounds, squares, rectangles, can work for you.

Syncro Corporation, Oxford, Michigan, manufactures quality jig saws for home workshops. Previously, they used a casting for the blade-yoke which requires a severe bend. ELECTRUNITE Square Tubing was recommended for one model, rectangular tubing for the other.

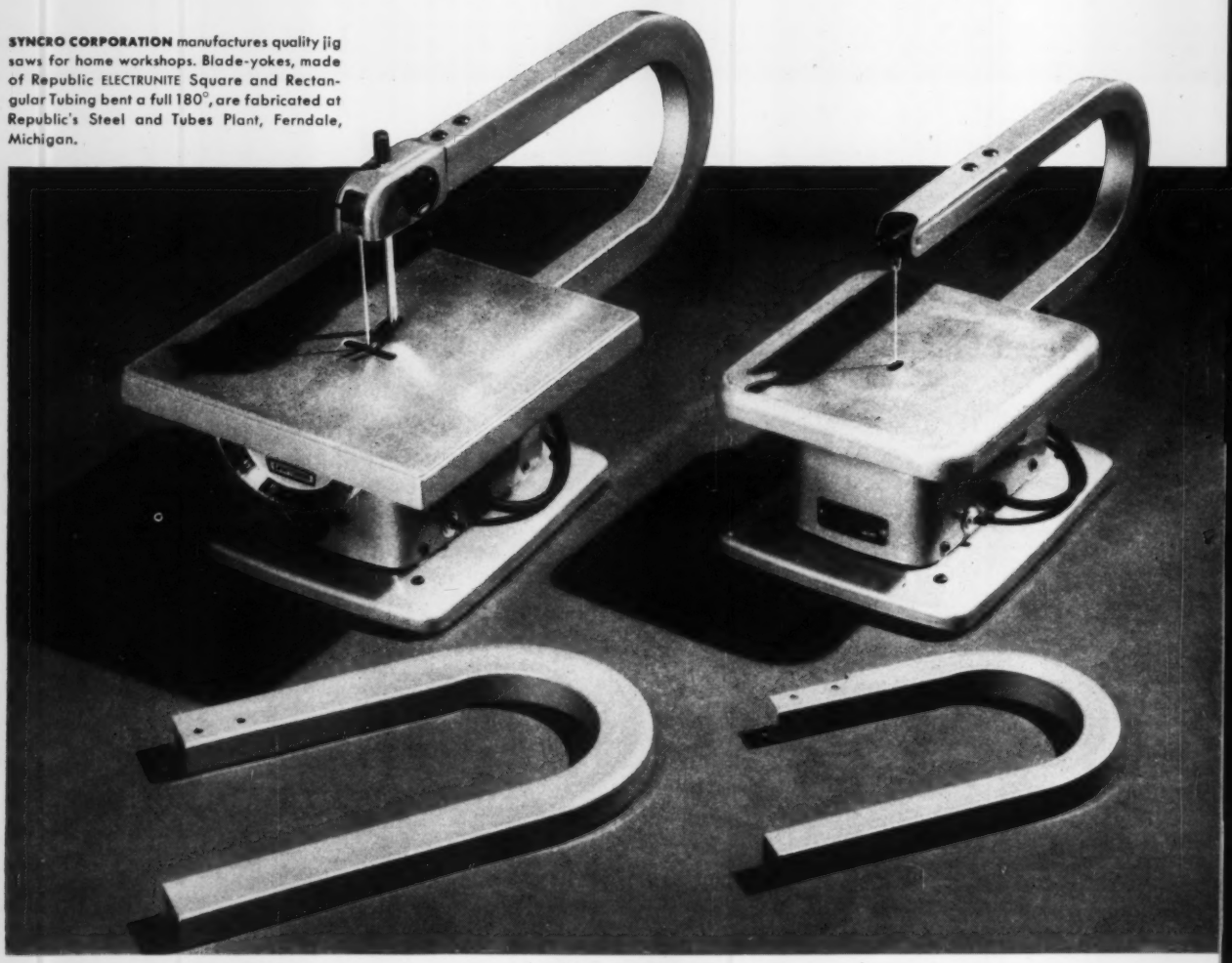
Results: Reduction of weight of the blade-yoke and improvement in the appearance of the product, at a savings in time, materials, assembly, and shipping costs.

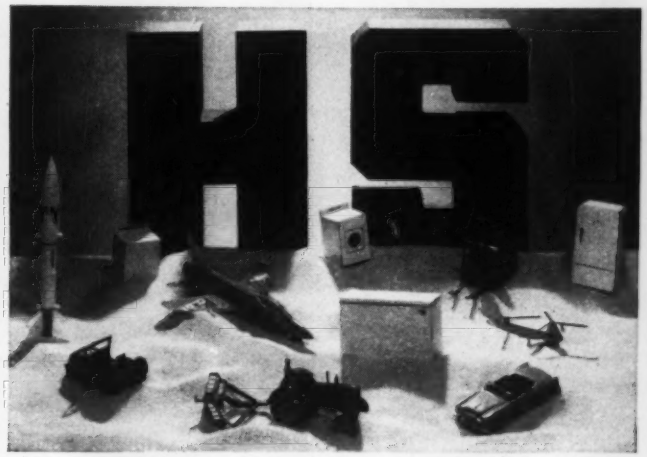
ELECTRUNITE solved this problem because Republic Mechanical Tubing is produced with the ability to withstand severe bending. In both models, ELECTRUNITE Mechanical Tubing is bent a full 180° without noticeable distortion or loss of strength.

Republic's Steel and Tubes Division has the facilities, equipment, and "know-how" to fabricate all grades and types of ELECTRUNITE carbon and stainless tubing into whatever shapes your product requires.

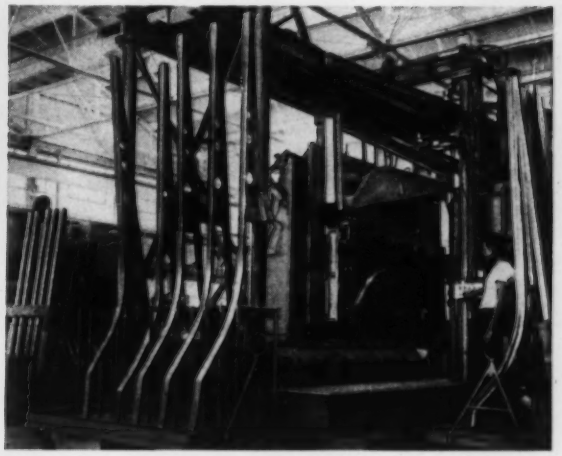
Learn more about the problem-solving advantages of Republic ELECTRUNITE Mechanical Tubing. Call your Republic representative, or write direct.

SYNCRO CORPORATION manufactures quality jig saws for home workshops. Blade-yokes, made of Republic ELECTRUNITE Square and Rectangular Tubing bent a full 180°, are fabricated at Republic's Steel and Tubes Plant, Ferndale, Michigan.





REPUBLIC'S NEW HIGH STRENGTH POWDER, TYPE H.S. 6460, opens the way to new markets for new applications using sintering for highly stressed parts. Type H.S. 6460 can be used with existing operating equipment. It provides a minimum tensile strength of 60,000 psi at 6.4 density as sintered, 100,000 psi heat treated. Type H.S. 6460 maintains its dimensional characteristics after sintering—less than .004 inches per inch shrinkage from die size at 6.4 density. Available in production quantities up to and including 12 tons, or in multiples thereof. Mail coupon for data.



REPUBLIC ALLOY STEEL SOLVES STRENGTH/WEIGHT PROBLEM. Rohr Aircraft Corporation, Chula Vista, California, is currently manufacturing flap tracks for an Air Force bomber fabricated from AMS 6428 Alloy Steel, with minimum tensile strength of 180,000 psi in the heat treated condition. Uniform response to heat treatment assures exceptionally deep hardening characteristics. Exceptionally high strength-to-weight ratio combined with highest strength values permits the design of thinner, lighter track sections. Save weight, hold down size without sacrifice of strength or safety. Send coupon for data.

THERE IS SATISFACTION in knowing that when you specify Republic Fasteners, you can count on consistent uniformity from one unit to the next, year in and year out. You get unswerving quality and dependability in each fastener, in any quantity. Skilled workmen, using modern production equipment like the nut former shown at right, maintain uniform qua'ity in each type of fastener. Your Republic Bolt and Nut Division representative or distributor will be glad to work with you to make sure you get exactly the right fastener to suit your application. Send coupon for full information on types and sizes.

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Please send additional information on the following:

- ☐ Republic ELECTRUNITE Mechanical Tubing
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- ☐ Republic Alloy Steel
- ☐ Bolts and Nuts
- ☐ Have a metallurgist call

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How

RYKO

In just two years since introduction, **RYKON** Grease has stepped in to deliver lubrication in hundreds of applications where other greases have failed

The reason RYKON Grease can perform under conditions that cause other greases to fail is this: RYKON Grease has a unique non-soap, organic thickener. This thickener holds the oil between its fibers better than any other gelling agent. The thickener is able to withstand extremely high as well as low temperatures. It resists chemical action and remains stable under conditions of severe working and water washing. RYKON Grease has exceptional anti-rust properties.

RYKON Grease's unique properties make it truly multi-purpose. This leads to many worthwhile economies. With one grease to do possibly every grease lubrication job in a plant, there's no chance for application mistakes. Inventory and handling of many single-purpose greases is reduced or eliminated. Maintenance training and supervisory follow-up is greatly reduced.

More facts about RYKON Grease are yours for the asking. Call the lubrication specialist in your nearby Standard Oil office in any of the 15 Midwest and Rocky Mountain states. Or write **Standard Oil Company (Indiana), 910 S. Michigan Ave., Chicago 80, Illinois.**

High temperature test for grease. Grease samples are spread on metal strips and placed in 350° F. oven for five days. Only RYKON Grease remained workable at end of test.

N GREASE *has performed in ten tough applications*

1

2

3

4

In the metalworking industry, where higher speeds, loads, temperatures and pressures are being put on bearings as a means of increasing productivity of equipment, a new type of grease has been needed. RYKON is that grease. Here are just 10 examples of how RYKON Grease has performed in tough spots:

Industry	Equipment	Type of Bearings	Conditions	Remarks
Steel Mill	various	plain and anti-friction	high temperature, heavy load, water, dirt	Outperforms all previously used greases. Less consumption, fewer bearing failures.
Steel Mill	tin line	plain and roller	high temperature, water	Hot caustic water caused other greases to run out and form deposits. RYKON lasts twice as long.
Metalworking	bearings over molten pot	—	high temperature	Temperature reaches 500° F. at times. RYKON stays in longer.
Steel Mill	pit crane, floor crane, charging car	plain and anti-friction	high temperature	Lasts twice as long as some other greases used.
Metalworking	drill head multi-spindle	anti-friction	heavy load	Other greases failed. Running cool on RYKON. No leakage.
Auto Manufacturer	switches on machine tools	—	wet	Good water protection and dielectric strength at a lower cost than previously
Die Caster	die cast machines	various	high temperature	Cut down wear considerably.
Bearing Manufacturer	high speed spindle bearings	anti-friction	high temperature, heavy load	Lasts twice as long as a high priced bearing grease. Does not darken or form varnish.
Steel Fabricator	core oven conveyer	pulley bearings	high temperature and dirt	Works where other greases ran out. RYKON best ever used.
Steel Fabricator	oven conveyer	ball	high temperature	All previous greases caused trolley bearings to stick. RYKON solved problem.

Oven test shows high temperature performance of RYKON Grease. 1. Metal panel coated with RYKON and placed in oven at 350° F. 2. Same panel after five days. RYKON is still soft and ready to lubricate. 3. Another high-melt grease ready for same test. 4. Same panel after oven test Grease has failed completely.

You expect more from **STANDARD** *and you get it!*

The bright, smooth surface of the sheet steel which International Harvester's Motor Truck Division demands for its light trucks is apparent here on the cab assembly line. Good surface speeds production in the paint shop.

Pittsburgh Steel's Sheet Provides Beauty, Durability For International Trucks

How do you combine ruggedness with the contemporary styling now going into light trucks?

International Harvester Company meets that challenge so well that one International model sells as a three-door station wagon. That's the Travelall, designed as a commercial, personnel carrier, which typifies the clean design of all International pick-up and panel trucks.

International combines ruggedness with good styling, in large part, through the use of cold rolled sheet steel, like that supplied by Pittsburgh Steel Company.

Here's what International expects from steel sheet and what Pittsburgh Steel provides consistently in shipment after shipment:

• **Deep Drawing Quality.** Many of the component parts have severe bends and sharp raises.

• **Weldability.** International spot welds sheet sections eight feet long in a series of welds on automatic machines. If welds vary in quality, assembly line operations must be interrupted.

• **Flatness.** When long sections are being welded, flatness of sheet is essential. Waviness would prevent close alignment of sections being welded and make it impossible to

use automatic welding machines on the plant's assembly lines.

• **Dense Surface With Extra Smoothness.** International insists upon, and gets, a near perfect surface. Pittsburgh Steel's cold rolled sheet, with its smooth and dense surface—free of defects—enables International to apply multi-coats of enamel without a primer. The production economies are passed on to International's customers.

International truck bodies go from assembly line to paint shop after an alkaline wash, a phosphate bath and an acid rinse.

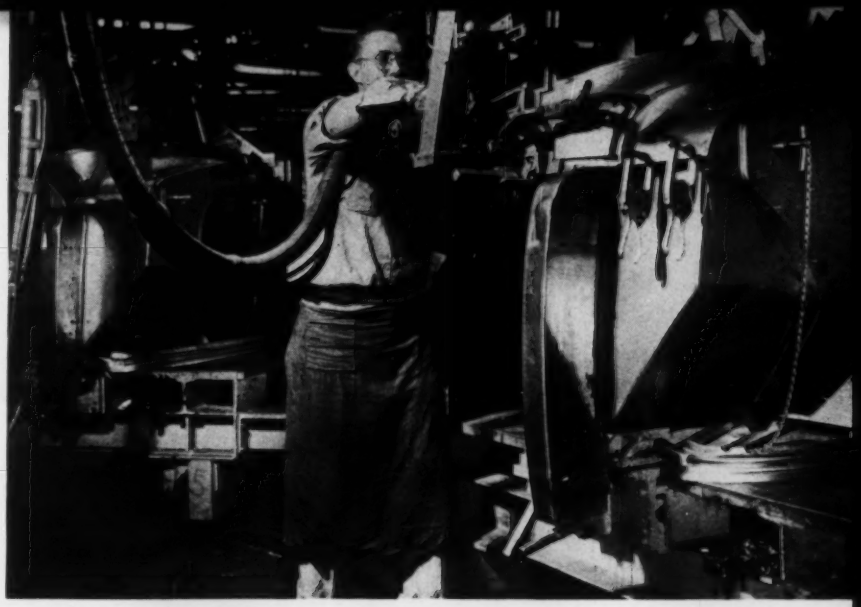
Only the best sheet surfaces make this practice possible.

Since the Springfield plant of International Harvester's Motor Truck Division can process about 10 million pounds of sheet a month, any supplier of sheet must be capable of consistently meeting International's requirements on a long-term basis.

The skilled steelmakers and the new rolling mill of Pittsburgh Steel Co. meet these demands from day to day and shipment to shipment.

Put Pittsburgh Steel's sheet to work for you. You get faster production, fewer rejects, more economical operations and a more durable product with a pleasing appearance.

You can start benefiting today. Just get in touch with the nearest district office listed below.



Weldability of the sheet shows up here where the door post, held by quick-action clamps, is spot welded to the cowl on the cowl sub-assembly line.

All components of the nearly completed cabs seen here are made of sheet steel. Note the sharp raises in the door post on which the cab door will be hung. This part, made of Pittsburgh Steel, must have good drawing quality as well as weldability and a surface that will take a fine paint job.

Fast production of cowl bars without rejects is possible only with sheet of good formability and shapeliness.

Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pa.

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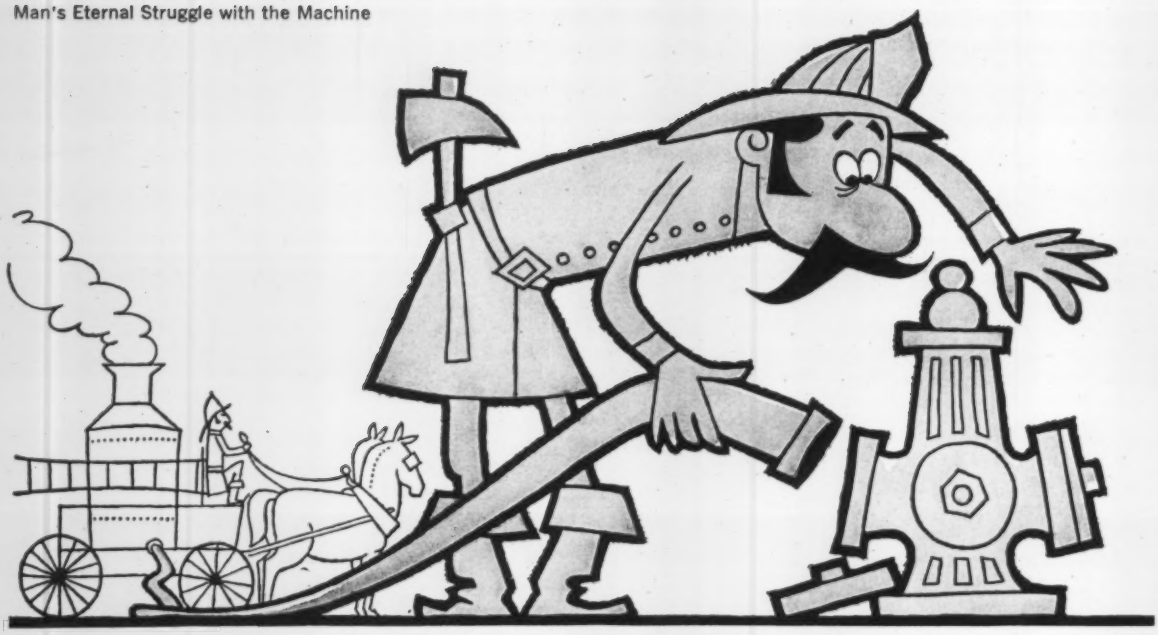
Man's Eternal Struggle with the Machine



AS PROFITS SHRINK AND COSTS CONTINUE TO GO UP, MORE THAN JUST "THE VENDOR'S QUOTATION" IS NEEDED!

Certainly you have to depend on your vendors... but how much?

The answer is "completely"! Your job is tough enough without your having to be a machine design or materials handling expert, too.

When you're specifying equipment, you should *only* have to provide an objective explanation of the problem, as well as the understanding of the product and related processes.

The vendor is the expert who's supposed to analyze that problem, then design and supply the necessary equipment. And the equipment should be ready to do your job when it's installed, too. Your overhead can't afford the lost production time and expense while you test and prove the vendor's equipment for him. After all, your original specifications called for equipment *to do a particular job.*

Sciaky has always accepted the vendor's full responsibility for design, manufacture and *delivery into production* according to the original specifications. That's why Sciaky resistance welding and production equipment satisfies the requirements of *your* particular job. That's why Sciaky operates the only independent, fully staffed and equipped Research Center devoted to advancing the application of resistance welding processes.

Why take less than the full advantage of consulting with a Sciaky Application Engineer the next time you are considering equipment. No obligation, of course.

The manufacturers of automobile wheels took that advantage. As a result those wheels are now assembled with automatic resistance welding that includes four other operations—not only assembled better, but faster and at lower cost. Write for the details of this unusual high production application that satisfies the most rigid specifications for weld quality.

SCIAKY

65A

SCIAKY BROS., INC., 4909 W. 67th STREET, CHICAGO 38, ILLINOIS • POrthsmouth 7-5600

for strength, corrosion resistance and safety . . .

it had to be Stainless

This window washer anchor is fabricated from Carpenter Stainless No. 4-A (Type 304) for use with window hardware on skyscrapers in large cities. Men attach their safety belts to these anchors while washing the windows. Stainless is used for maximum corrosion resistance and strength in atmospheric conditions. In fabrication, the forging bars must flow freely without tendency to rupture. Since switching to Carpenter, the forging shop has reduced rejections because of the cleaner, defect-free surfaces. The Carpenter representative near you can supply close metallurgical cooperation and complete technical data on your stainless requirements. The Carpenter Steel Company, 139 W. Bern Street, Reading, Pa.

Carpenter STEEL

The Carpenter Steel Company

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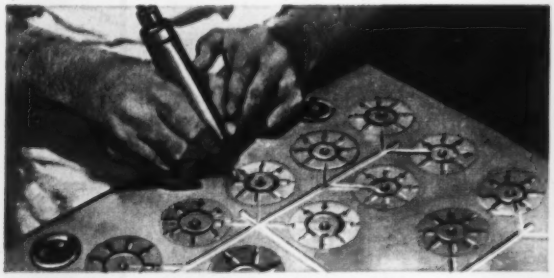
Alloy Tube Division, Union, N. J.
Webb Wire Division, New Brunswick, N. J.
Carpenter Steel of New England, Inc., Bridgeport, Conn.

Toolmaker's Skill is the marvelous science of making things fit.

Making tools for toolmakers

Gage Blocks, so important to toolmaker's precision measurements, obtain their own close accuracy through the use of Norton lapping machines. Norton lappers are among industry's most valuable "fit and finish" tools.



Die Making gets increasingly delicate as the work nears the finish. Here the toolmaker adds his final touch, using a Norton tiny grinding wheel — preferred because his work must be perfect.

Touching Up a high speed milling cutter is often done with an India brand oilstone file. Final honing is frequently done with an Arkansas oilstone file. Norton and its divisions are the important sources for both.

Micrometers Themselves are a product of precision manufacture and precision-prepared abrasives. Here a man is grinding a micrometer thread die with a Norton V-face grinding wheel. There are more than 200,000 types of Norton grinding wheels.

Making better products...

puts a man on his mettle

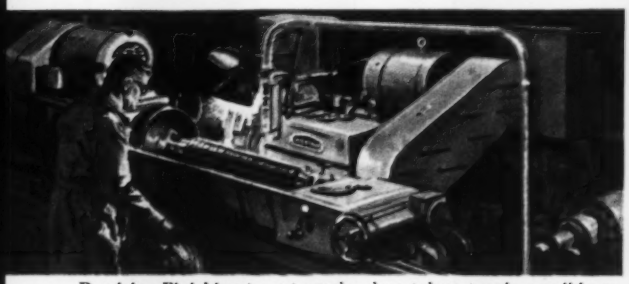
Inventing a tool to make other tools better was the work of an unknown prehistoric genius. A nice start!

Thousands of years later — here at Norton Company — a constant improvement of tools for more efficient production is still going on. Bigger, better and more important as science opens new vistas. Based on this invention, toolmaking has become a great industry serving all industry.

Norton abrasives are chief among "toolmakers' tools" — respected and preferred wherever toolmakers are at work. It is this craft of the toolmaker that turns the designer's ideas into practical production implements.

On this page are a few of the many modern ways in which Norton helps the man who uses the micrometers. Further along — on the production line — Norton abrasives keep the work coming out as it should. This is how Norton serves — making better products . . . to make your products better.

NORTON
ABRASIVES



Precision Finishing to extremely close tolerances is possible on this large Norton grinding machine. Precision engineering gave it a "feather touch". Here a machine spindle is being finished to an accuracy of plus or minus 1/10 of a thousandth of an inch.

Around the world and still expanding

Grinding Wheels Plants — Worcester, Mass.; Santa Clara, Calif.; Hamilton, Ontario; South Africa; England; France; Germany; Italy; Brazil.

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Refractories Plant — Worcester, Mass.

Electro-Chemical Plants — Chippawa, Ontario; Huntsville, Alabama; Cap-de-la-Madeleine, Quebec.

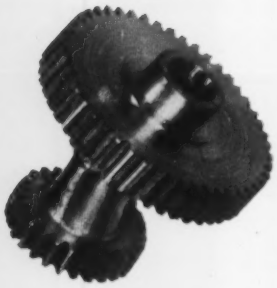
Norton Pike Plant — Sharpening Stones — Littleton, New Hampshire.

Bauxite Mines — Bauxite, Arkansas.

General offices: Norton Company, Worcester, Mass.

to make your products better

How to avoid alloy steel failures



Ordinary precautions may protect you most of the time. But your luck could run out—and a single alloy steel failure can result in serious loss.

That's why the *extra* precautions of the Ryerson Certified Alloy Steel Plan are important to you. Under this plan you know three vital facts about the alloy steel you order from Ryerson stock:

- **Heat identification** . . . not just type identification, but the positive identification of your particular heat of alloy which has been spark-tested and separately racked to eliminate the possibility of mixed steels.
- **Chemical analysis** . . . not just the chemical range for the type, but the specific analysis of the heat from which your steel was rolled—keyed to your steel's identification.
- **Hardenability** . . . not just the average hardenability for the type of alloy, but the actual test-proved hardenability of your particular heat of steel, as-quenched and at three draw temperatures.

As a result, you can be sure of the steel you get from Ryerson—sure of what it will do . . . and sure of how to heat-treat for desired properties.

This extra protection is yours at no extra cost. So call your nearby Ryerson plant for every alloy steel requirement—and be sure.

RYERSON CERTIFIED QUALITY®

RYERSON STEEL®

Member of the INLAND Steel Family

Principal Products: Carbon, alloy and stainless steel—bars, structurals, plates, sheets, tubing—aluminum, industrial plastics, metalworking machinery, etc.

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DETROIT · PITTSBURGH · BUFFALO · INDIANAPOLIS · CHICAGO · MILWAUKEE · ST. LOUIS · LOS ANGELES · SAN FRANCISCO · SPOKANE · SEATTLE

Rails Seek Effective Government Aid

Expect the nation's railroads to ask this session of Congress to fill the prescription turned down last session. The bill Congress passed guaranteeing loans hasn't been much help—due to delays, red tape, the requirement that roads pay the loan before paying dividends, and other drawbacks (Page 37). The rails will buy more equipment this year than last.

Saltonstall Asks Aid for Defense Contractors

Sen. Leverett Saltonstall (R., Mass.) introduced a bill (S. 500) to drastically revise defense procurement. It would: 1. Exempt incentive type contracts from renegotiation (see STEEL, Nov. 24, 1958, p. 62). 2. O. K. more extensive use of negotiated contracts. 3. Require major contractors to do more subletting to small business. It promises better weapons faster and cheaper but will stir up new charges against "big business" management of the defense program. It also runs into trouble from legislators like Rep. Carl Vinson (D., Ga.), who thinks more advertising for bids is the best way to aid small business.

Can Ike's Budget Keep Its Balance?

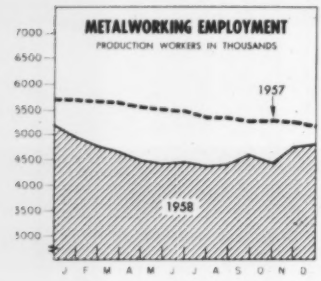
Prospects for a balanced budget in fiscal 1960 aren't as good as the figures indicate. The $100 million surplus President Eisenhower is counting on won't come easily. Congress will have to reduce spending for several major programs that are pet projects of some Democrats. And the legislators will have to boost gasoline taxes, postal rates, and charges for government services. Example: Ike counts on new revenue of $350 million from revised postal rates and $690 million from higher gasoline taxes. He also asks that spending for commerce and housing be slashed 40 per cent. The defense budget offers metalworking some fair-sized projects (Page 39).

Economic Barometers Signal Sunnier Days

Six indicators of metalworking's business trend are pointing upward: 1. December housing starts declined much less than usual for the time of year; the 91,000 units represent a 40 per cent gain over December figures for '56 and '57. 2. Business failures dipped 3 per cent in December, reports Dun & Bradstreet. 3. Manufacturers' shipments of gas ranges in 1958's last month were 36 per cent higher than they were in the year-earlier month, says Gas Appliance Manufacturers Association. 4. The steel forging indus-

try's backlog on Dec. 1 was 4000 tons higher than it was a month earlier. 5. Primary aluminum production hit a monthly record (152,301 short tons) in December. 6. New business incorporations also set a monthly record (16,446) in December.

Production Will Outrun Employment



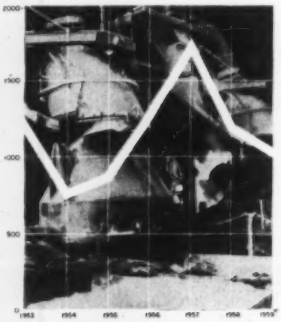
Expect metalworking to continue turning out more goods with fewer workers. While production is nearly as high as it was a year ago (Page 59), employment is substantially lower (see chart). Cost trimming moves triggered by the recession are the main contributing force. Another factor: Overtime is rising. Sometimes a little overtime is cheaper than adding workers.

Better High Temperature Materials Coming

Look for better high temperature materials to result from a new process that disperses ceramic particles in metals. The alloys retain working strength at 90 per cent of their melting points. While now confined to nonferrous metals, the process should work with ferrous metals (Page 89). Cheaper cermets with better heat resistance are promised by another new technique (Page 84).

Steel's Capital Spending Will Drop This Year

You can expect U. S. iron and steel producers to spend about $1 billion plus for capital improvements this year—vs. $1.2 billion last year. Steel company executives blame inadequate depreciation allowances and present excess capacity for the decline (Page 42). Malleable iron foundries offer a somewhat brighter market; three of four expect to buy new equipment this year. They'll lay out about $6 million for new facilities—much of it for equipment to make pearlitic malleable iron (Page 42).



Stampers Plan Expansions

A Pressed Metal Institute survey of stampers' 1959 expansion plans shows: In New England, 10 per cent will add floor space; in New York City, 6.6 per cent; in the Delaware Valley, 12.5 per cent, in the Chicago area, 20 per cent. The association reports half its members purchased presses last year.

Foundries Expect Good Sales Gains

Foundry industry leaders contacted by STEEL last week were unanimously optimistic about 1959 sales prospects. The gray iron people expect to sell 12

million tons this year, vs. about 10.4 million last year; steel foundries hope to operate at around 58 per cent of maximum commercial demand, vs. about 40 per cent in '58; the malleable foundry industry expects 1959 sales to beat 1958's by 18 per cent; nonferrous foundries are in the midst of an upturn.

New Technique Slashes Casting Costs

Now you may be able to use parts made by investment casting—if price was the deterrent before. A new technique promises to halve the cost of many parts, save even more on others. The secret is the use of a thin ceramic shell to replace the stainless steel flask and investment backup in the mold. It cut the cost of one part from $16 to $6 (Page 72).

George Meany Squirms in Hot Seat

Look for craft unions, especially in the AFL-CIO's Metal Trades Dept., to step up their drive to organize industrial plants. The crafts believe they can compete for all employees in a plant by banding together in a single bargaining unit, just as an industrial union would. It's a threat to the 68 industrial unions; they are protesting to the AFL-CIO's Executive Council. If the council rules against the crafts, several may secede—and they could help James Hoffa build a powerful new group around the Teamsters. A council ruling for the crafts would signal open warfare between the two factions in organizing drives. It puts AFL-CIO President George Meany on the hot seat.

Uncle Sam to Probe Inflation's Causes

The President's economic report to Congress indicates a new approach to halting inflation (Page 46). A number of the Council of Economic Advisers believes that Uncle Sam may be helping, not halting, the cost spiral now. He says the restriction of imports, for example, may boost prices rather than protect domestic industries. He believes Uncle Sam may be able to take a giant step toward stability by controlling his own procurement activities. A committee will be established to try that approach.

How USW Woos the Public

Watch for more newspaper advertising by the United Steelworkers aimed at selling the public on the validity of a big wage boost to increase steelworkers' purchasing power. They kicked off the campaign last week with a "memo" to auto company chiefs in which they said: "How well we do with our '59 model will almost certainly decide how you'll do with yours." The USW '59 model: "$1 billion in new money." A union spokesman in

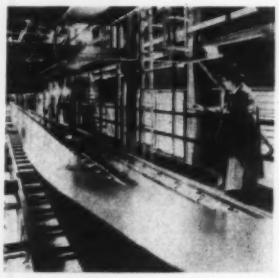
Pittsburgh says: "We're aiming at 37.5 cents per worker." About 680,000 USW members get cost-of-living increases this month.

Steer Clear of Miners' Concession

The United Mine Workers now have the right to examine the records of anthracite mine operators for all "data related to wages, hours, and working conditions." It's an important foot-in-the-door for John L. Lewis—a "practice that should be guarded against," says one veteran negotiator. "It leads to unions being allowed to determine exactly how much management can afford to pay in new wage demands," he continues.

Memo to Users of Galvanized Sheets

You may have to allow longer leadtimes on orders for galvanized sheets in coming months. This year, producers expect to better last year's record production by 20 per cent. Consumers are already building inventories to hedge against a strike threat; producers are operating at near capacity and expect to keep up the pace until midyear. A deep dip will come in the third quarter, they say (Page 98).



Big Three's SUB Cost Is $40 Million

Around $2 million in retroactive SUB payments will be made to Chrysler workers. That brings the total 1958 SUB benefits paid to UAW members by the Big Three carmakers to about $40 million. GM workers got $16.3 million, Ford workers received $13.2 million, and the Chrysler total will now exceed $10 million.

Small Car Market Still Growing

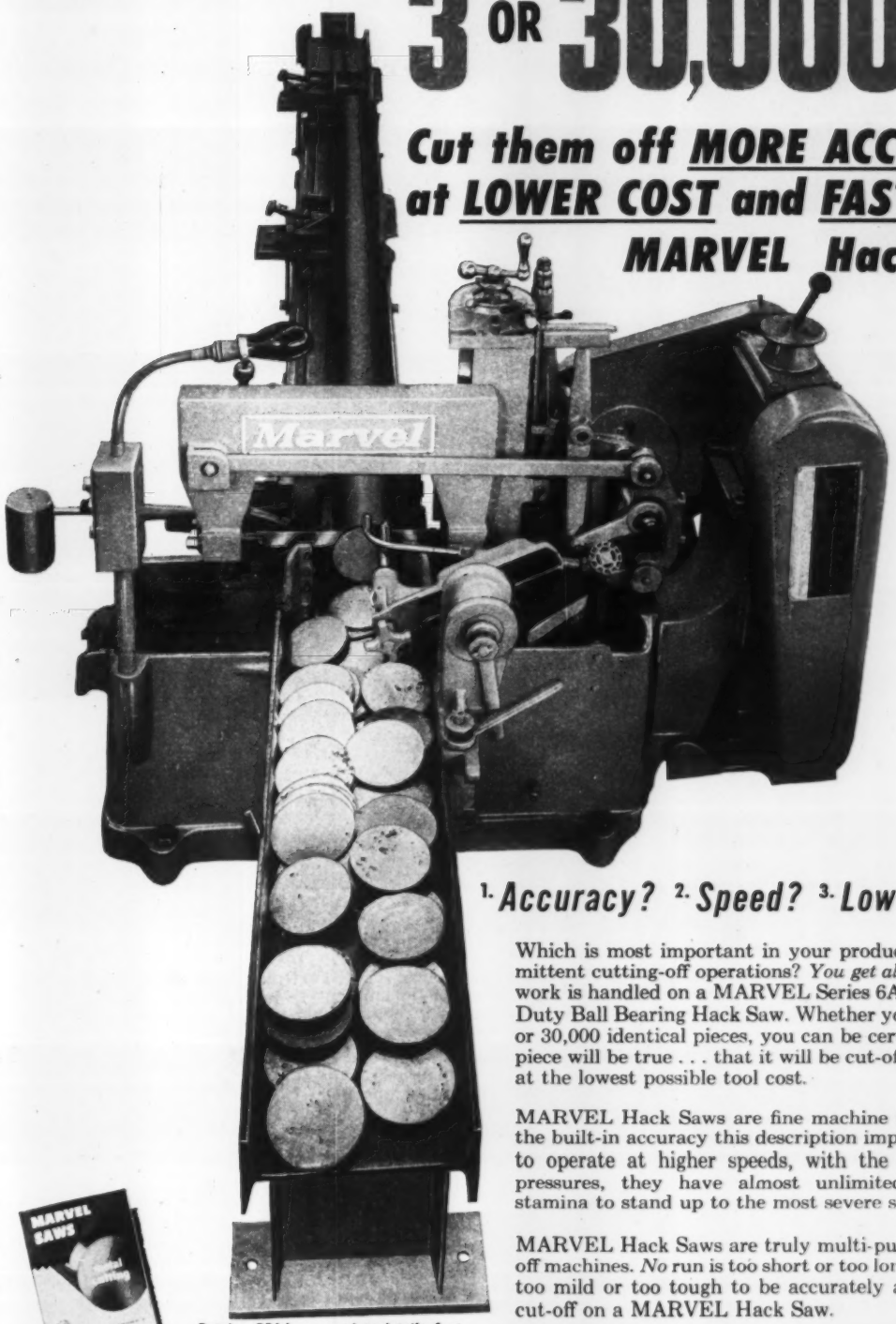
December brought a record in small car sales. More than 78,000 (including 27,150 Ramblers and 10,500 Larks) were sold during the month—nearly 15 per cent of total sales (vs. less than 6 per cent in the year-earlier month). Foreign car sales in the U. S. last year climbed 91.5 per cent above the '57 level, while domestic sales dropped about 27 per cent. Foreign makes now have better than 8 per cent of the U. S. market.

Straws in the Wind

Jones & Laughlin Steel Corp. will soon introduce a new stainless steel that offers good potential for aircraft and missile uses . . . National Homes Corp.'s dealers sold 1026 homes in two weekends—more than half aluminum models. The firm says we need 1.2 million homes annually just to keep pace with the nation's needs, and by 1965, we'll need 1.6 million . . . Expect the UAW to settle with Allis-Chalmers for essentially what it got from International Harvester . . . You can anticipate higher prices on some petroleum products as a result of recent wage boosts in the oil industry.

3 OR 30,000 PIECES

Cut them off MORE ACCURATELY at LOWER COST and FASTER on a MARVEL Hack Saw



1. Accuracy? 2. Speed? 3. Low Cost?

Which is most important in your production or intermittent cutting-off operations? *You get all 3* when your work is handled on a MARVEL Series 6A or 9A Heavy Duty Ball Bearing Hack Saw. Whether you're cutting 3 or 30,000 identical pieces, you can be certain that each piece will be true . . . that it will be cut-off quickly, and at the lowest possible tool cost.

MARVEL Hack Saws are fine machine tools, with all the built-in accuracy this description implies. Designed to operate at higher speeds, with the heaviest feed pressures, they have almost unlimited power and stamina to stand up to the most severe service.

MARVEL Hack Saws are truly multi-purpose cutting-off machines. *No* run is too short or too long, *no* material too mild or too tough to be accurately and efficiently cut-off on a MARVEL Hack Saw.

Catalog C56 has complete details, facts and figures on MARVEL Metal Cutting Saws. Write for it today.

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Better Machines–Better Blades

Nickel makes steels even better

Properties that Nickel improves include toughness, resistance to impact (particularly at low temperature), corrosion resistance, heat treatability, fatigue resistance, many more.

Nickel provides versatile steels like the two widely warehoused types AISI 4340 and AISI 4615-20.

The four more recently developed steels described below show how Nickel helps produce specialized steels, too.

AISI 4340 Through-hardening
4340 stands alone among medium carbon steels in its ability to provide maximum strength, ductility, toughness and resistance to fatigue in parts of medium to heavy cross section.

AISI 4615-20 Carburizing
4615-20 is a carburizing steel that has consistently proved itself the ideal for a wide variety of carburized parts. It's easy to harden and has a minimum tendency toward distortion in heat treatment.

Ultra-High-Strength Steel — 300 — M
Originated for aircraft landing-gear, ultra-high-strength steel develops 300,000 psi tensile strength yet retains high toughness. Amazing savings in weight and bulk are possible.

9% Nickel Steel
- Carburized applications — Develops full hardness . . . case *and* core . . . with furnace cooling (no liquid quench). Minimum distortion.
- Low Temperature applications — Resists brittle fracture to –320°F. Improves strength of large rotating parts.
- Petroleum applications — In certain applications such as the handling of sweet crude this steel has exceptional corrosion resistance.

5% Nickel — 2% Aluminum Steel
Provides highest core strength obtainable in age-hardening and nitriding steels along with extreme surface hardness. Noteworthy resistance to wear particularly at high temperature.

New Ni-Cr-Mo Carburizing Steels
New Nickel-containing carburizing steels offering an attractive combination of economy plus superior engineering and processing properties. These steels have proved of particular interest to the automotive industry where they are now being exhaustively tested.

For metallurgical or engineering details, for help in applying these steels, feel free to call on Inco's Development and Research Division.

The INTERNATIONAL NICKEL COMPANY, Inc.
67 Wall Street New York 5, N. Y.

INCO NICKEL

NICKEL MAKES ALLOYS PERFORM BETTER LONGER

Got Too Many People?

"If a company has enough people to get the job done, it has too many."

That statement was made to us a few days ago by the president of a medium-sized metalworking company. Here's what he meant:

During lush times, order backlogs are extended. Production is in high gear. Profits are abundant. People (whether in plant or office) simply don't do their best work. They go soft.

Production workers do not care to drive themselves too hard even though they have the incentive of bonuses.

Indirect labor, such as operators of material handling equipment, can get by even easier since their performance is not tied to unit production.

Office people, simulating overwork, can win their case with the boss for more help.

Supervisors can make their jobs seem more important by indulging in empire building. More people are taken on, or new subdepartments are set up to handle an alleged larger volume or new functions.

Even the bosses can contribute to inefficiency by being satisfied with the status quo, or by deliberately hoarding workers and technical talent they think may be scarce later on.

Then came the sharp recession of late 1957 and early 1958. It cast the spotlight on inefficiency and waste of manpower.

Dwindling order backlogs and disappearing profits forced management to lay off production workers and prune out the deadwood among other personnel.

The president we quoted above reduced his payroll from 1200 to 545 when the recession struck. It's back to 900 now that orders are again flowing in faster.

But, relatively speaking, the company is getting much more production than it did with 1200 on the payroll.

The deadwood is gone. Those who still have jobs are working harder and more enthusiastically than ever before.

Perhaps there is a moral in this story for your company.

Irwin H. Such

EDITOR-IN-CHIEF

NOW...AT INLAND...500,000 ADDITIONAL TONS CAPACITY FOR COLD ROLLED SHEET PRODUCTS . . . a half-million more tons of the same uniformly dependable steel that has made *Inland Quality* the recognized standard among manufacturers throughout the great Midwest. Inland's giant, new 4-stand tandem mill, most powerful of its size in the industry, is part of Inland's program of expansion, keeping pace with the growth of Midwest manufacture. New pickling, continuous normalizing, annealing and tempering facilities do their part in producing this quality steel for your use. This new capacity means better service for you from Inland.

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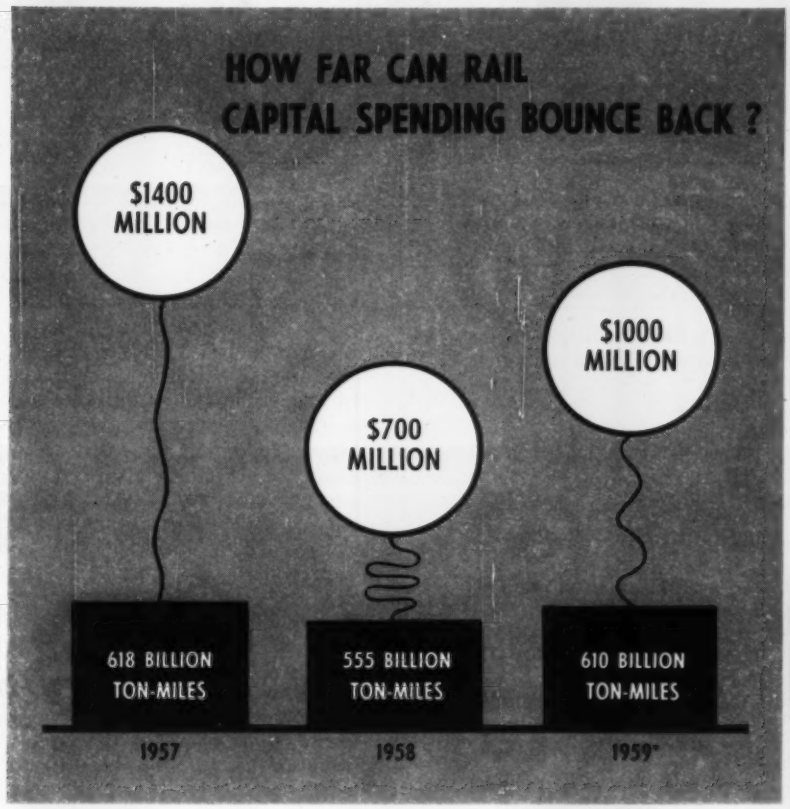


*Estimated.

U. S. Railroad Aid Fails To Cure Ills

The loan program voted by Congress last year has given practically no help to the roads or to equipment builders. In fact, few have applied for aid

LAST YEAR, Congress O.K.'d a plan to guarantee loans to railroads for the purchase of new equipment —after it deleted provisions aimed at reducing the carriers' tax burden. Only a fraction of the money has been asked for; and none of it has been handed over. The ailing industry is contemplating self-help, but it will ask Congress at this session to refill its prescription.

• **No Takers**—Up to last week, five railroads have applied to the Interstate Commerce Commission for guarantees on $29.5 million worth of loans, only a little over 5 per cent of the money available via the guarantee route. Not a single freight car is involved. Sixty locomotives are in the application of one road, accounting for about half the dollars. The remainder of the money is for maintenance, control equipment, and replacement of capital.

The first application was received by the ICC two months ago. There is no indication how soon it may be acted upon. The delay helps to explain why the roads aren't anxious to seek Uncle Sam's help.

• **Big Drawback**—The requirement that the road must be turned down by private lenders before applying also helps to keep the applications down.

Biggest drawback is the requirement that the road can't pay its stockholders any dividends until the loan is repaid.

• **Situation Unchanged**—So despite Congressional efforts last year, the situation is basically the same as it was at the depth of the recession.

The roads will make more money this year, admits an Association of American Railroads spokesman, and will be able to boost their spending for new equipment this year (see chart), but a better year simply postpones the so-called decline of the rails.

Even in a recession year, notes

WHAT THE RAILROADS WANT FROM CONGRESS IN '59

1. The chance to diversify into other methods of transportation (trucking, pipelines, inland waterways, and airlines), which are heavily subsidized by public money.

2. Payment for other transportation facilities (highways, waterways, and airports) by the users rather than the general taxpayer.

3. Repeal of the 10 per cent travel tax.

4. Amendment of the Railroad Unemployment Insurance Act (employees do not contribute to this fund) to allow the roads to stop paying benefits to those discharged for just cause, who quit voluntarily, who are on strike or pregnant, or who are entitled to other benefits.

5. Repeal of the agricultural commodities exemption which allows truckers to negotiate their rate with the shippers while railroads must adhere to ICC regulations.

6. Changes in depreciation policy.

the U. S. Chamber of Commerce, the trucking industry, the pipelines, and the inland waterways were able to hold their own in terms of ton-miles of products handled. Rail ton-miles fell 10 per cent. In 1959, the rails won't regain their 1957 level, while truckers expect their best year in history; pipeline activity should follow the 3.5 per cent increase in oil shipments; and inland waterways will continue postwar gains.

• **Not So Inevitable**—The industry is trying to get the public to understand that railroads aren't doomed merely because the nation has moved into the jet age and is spending billions on new highways. Basic to this reasoning is the need for the rails in wartime.

• **Merger Trend?**—"We need four railroads in this country," says a government official: "Northeast, southeast, southwest, and northwest." That proposal assumes a merger between the New York Central and the Pennsylvania, something that is not going to happen, if the Pennsy's president, James Symes, is right. "There are too many obstacles," he says.

What is more likely: Continued efforts to co-operate.

Other mergers are more likely. At a conference of eastern railroad presidents next month, the NYC will recommend that the East needs only three or four systems. Three Minneapolis based roads have approved a merger study. Two Middle Atlantic roads which compete against the Chesapeake & Ohio are reported talking.

One road is taking a more direct approach to its sales problem: The Chicago, Rock Island & Pacific will reduce passenger fares 28 per cent for the next nine months. Most rails think such a move would help, but they want the government to start the ball rolling by eliminating the 10 per cent tax on passenger tickets. Sen. George Smathers (D., Fla.), a friend of the rails, has introduced such a bill.

• **Congressional Attitudes**—Senator Smathers is also a principal figure behind Senate Resolution 303 of last session. It calls for a full investigation of all transportation issues. A report was due the end of the month, but it will be delayed.

While the rails have many friends on Capitol Hill, the truckers, airlines, and waterways can put up strong opposition to many of the changes the Association of American Railroads wants (see at left). Repeal of the 10 per cent passenger tax is rated the best chance for approval this session.

• **Summing Up**—The case for the railroads: They must struggle to keep rolling at a time when they should be sensing future trends in transportation and responding to them. This year, it will take hard work to boost ton-mileage 10 per cent, but they will see their share of over-all ton-mileage fall. The U. S. Chamber of Commerce forecasts that the transportation industry will do 1650 billion ton-miles of business in 1965, vs. 1242 billion in 1958 (rails accounted for 45 per cent). By 1975, the transportation industry will be at a 2100 billion ton-mile level. To hold its 45 per cent share, the railroad industry will have to hit 945 billion ton-miles. Obviously, it'll have to boost its profit ratios above its current 2.75 per cent return on net investment.

Another factor: A possible freight car shortage. BDSA figures 65,000 cars are retired every year. Delivery of new cars fell 50 per cent last year to about 40,000. The net loss: About 25,000 cars.

Including company shops, our car-building capacity is between 100,000 and 120,000 a year; but, says BDSA, production is limited to 90,000 yearly by plate, structural steel, wheel, and axle capacity. That figure would result in a net gain of only 25,000 cars a year, inadequate in the event of war.

How Metalworking Fares in '60 Budget

Precarious Balance Will Be Held by . . .

(Billions of dollars for fiscal years)

Source	1959	1960	% Change
Total receipts	68.0	77.1	+13
Total expenditures	80.9	77.0	− 5

1. More Revenue from Taxes

Personal income taxes	36.9	40.7	+10
Corporate income taxes	17.0	21.5	+26
Excise taxes	8.5	8.9	+ 5
Other receipts	5.6	6.0	+ 7

2. Cutting Fat from Major Programs

National security	46.1	45.8	− 1
International affairs	3.7	2.1	−40
Commerce & housing	3.5	2.2	−40
Agriculture	6.8	6.0	−12
Natural resources	1.7	1.7	0
Labor & welfare	4.4	4.1	− 7
Veterans	5.2	5.1	− 2
Interest	7.6	8.1	+ 7
General government	1.7	1.7	0
Contingencies allowance	0.2	0.1	−50

"A POLITICAL BUDGET," comment leading Democrats.
"A SOUND PLAN for the future," proclaim Republican advocates.

The subject is President Eisenhower's budget for fiscal 1960. In precarious balance as issued (see table), it will probably be toppled by Democratic spending. Chairman Clarence Cannon (D., Mo.) of the House Appropriations Committee recognizes that the Democrats will probably be blamed for any deficit in fiscal '60 even if they don't hike spending. House Leader Sam Rayburn (D., Tex.) warns that the President's revenue forecasts may be too optimistic; Ike's spending plans alone could result in a deficit.

• **Confidence**—But the administration, from the Council of Economic Advisers to the Treasury Department, believes recovery is assured, although it may not match the 1955 pace. Forecasting a $10.5 billion increase in corporate profits this year, Treasury notes that the fourth quarter annual rate in 1958 was $44 billion, only $3 billion shy of the estimate for all of 1959. A surplus of $100 million in fiscal 1960 will represent a tremendous turnaround from the deficit of $12.9 billion forecast for this fiscal year.

The new budget contains a few gimmicks to achieve balance. The allowance for contingencies (another Lebanon or a great scientific breakthrough) has been cut in half. The International Monetary Fund will get $1.4 billion as a supplement to fiscal 1959, rather than as part of next year's budget.

• **New Taxes**—And Congress will have to go along with Ike's request for new revenues: An increase in gasoline taxes for the Highway Trust Fund (worth $690 million); revised postal rates ($350 million); new life insurance taxes ($200 million); revised depletion allowances on clay products and new taxes on co-operatives ($50 million); higher aviation gas taxes, plus a new levy on jet fuel ($100 million, including the transfer of $34 million from the Highway Fund); adjusted fees for users of government services like

In Ike's defense budget . . .

Here Are Metalworking's Plusses:

1. More B-52s, B-58s, and KC-135s.
2. Speedup in development of B-70 and F-108.
3. More Navy fighters.
4. More Army observation aircraft.
5. A 50 per cent increase in Titan program (including bases).
6. A 40 per cent hike in development funds for Minuteman.
7. Continued production of Atlas, Mace, Bomarc, Hercules, Hawk, Sparrow III, Bullpup, Sidewinder, Talos, Tartar, Terrier, Falcon, and Quail.
8. Continued development of Eagle and Corvus.
9. Speedup in Hound Dog, Nike Zeus, and Dynasoar.
10. A new Forrestal class carrier (conventionally powered).
11. Order of long leadtime items for three Polaris subs to be started in fiscal 1961. (Nine will be under construction by the end of fiscal '60.)
12. Six guided missile destroyers and frigates will be started.
13. Thirteen ships will be converted for missiles.
14. Continued development of very early warning systems, missile defense, solid fuels, and satellites for reconnaissance.
15. More spending for Man-in-Space (with NASA budget).

Here Are the Minuses:

1. Fewer helicopters for the Army.
2. No interceptors for the Air Force.
3. No speedup in the A-plane program.
4. Phasing out of Jupiter, Thor, Redstone, and Corporal.

patents and trademarks ($15 million).

Ike also requests continuation of the Renegotiation Act and present personal, corporate, and excise taxes. He makes no mention of depreciation reform.

• **First Attack**—Though the Budget Bureau claims there are "no real reductions of public welfare benefits," the first Congressional attacks will most likely be in that area. Housing and airport hearings will be held this month.

Sen. Lyndon Johnson (D., Tex.), Senate majority leader, has announced hearings on the relation of our missile and space programs to Russian progress. Major headlines will be made in this squabble because the new budget does not ask for a sharp speedup in our programs. The National Aeronautics & Space Administration gets a $48 million supplement for fiscal 1959 to bring its current budget up to $153 million; 1960's fiscal budget will be $280 million. The Atomic Energy Commission will spend $2.7 billion next fiscal year, vs. $2.6 billion this year.

• **Defense Holds Steady**—The Defense Department will spend about $150 million more in fiscal 1960 than fiscal 1959's $40.8 billion. The breakdown (rounded figures in billions of dollars):

Personnel	11.9
Operation & maintenance	10.4
Procurement	13.9
Aircraft	6.2
Missiles	3.8
Ships	1.7
Research, development, test & evaluation	3.4
Construction	1.7

The Army gets $9.3 billion next fiscal year (an increase of $100 million from fiscal 1959); the Navy, $11.6 billion (up $100 million); the Air Force, $18.7 billion (a cut of $30 million). Advanced Research Projects Agency will spend $415 million, almost twice its fiscal 1959 allotment.

In fiscal 1960, fewer dollars will go for Thor and Jupiter procurement; more money has been moved into the R&D category for advanced types. The Atlas will be operational by June; the Titan next year. Unofficially, 20 squadrons (of ten missiles each) will be procured. Less than ten squadrons of IRBMs will be bought, and no funds are planned for their procurement in fiscal 1961.

The budget signals less reliance on IRBMs and ICBMs. Advances in bomber-fired missiles, like Hound Dog, give our aircraft greater life expectancy than was predicted a year ago when the Thor first went into production. This presumably means our bomber fleet will continue to be our major deterrent force, at least until the Minuteman is ready—perhaps by 1963.

• **Looking Ahead** — The Budget Bureau feels revenues in 1961 may run $3 billion higher than 1960's, assuming a steady growth of the economy. Various officials say the surplus will be used for paying off some of the national debt, rather than cutting taxes, unless the economy needs a stimulus. Tax reductions, notes President Eisenhower, may be possible after that.

The budget is based on little or no inflation in the coming year, and is specifically designed, say administration sources, to thwart inflationary trends which may arise again toward the end of this year.

Housing's Impact on Metalworking

Each 100,000 new homes provides a market for these products, estimates the NAHB:

Steel	200,000 tons
Water closets	156,000 units
Bath tubs	127,000 units
Warm air furnaces with ducts	73,000 units
Electric switches	1.1 million
Garbage disposals	32,000 units
Kitchen exhaust fans	55,000 units
Air conditioners	7,000 units
Kitchen cabinets	1 million

Celotex Corp.

1.2 Million New Homes in '59

FLUSHED with optimism from the upsurge in housing starts in 1958's fourth quarter, home builders in Chicago last week exuded confidence, predicting that 1.2 million units will be built again this year.

Reynolds Metals Co. announced a $2.5 million aluminum-for-the-home promotional program. The electrical industry launched a campaign to modernize 300,000 houses, creating a $372 million market for electrical equipment and services.

• **Credit Bogy**—But while starts are running at a near record clip (in December at an annual rate of 1.4 million units), the home builders are also looking over their shoulders at their biggest bogy—mortgage credit. Tight money signs are appearing again.

The National Association of Home Builders is primed for combat. Nels G. Severin, president, outlined a central mortgage reserve facility on which NAHB will seek Congressional action. Functions: 1. To stabilize the flow of mortgage credit. 2. To convert home mortgages into a more negotiable instrument so that pension funds and similar forms of savings can be tapped.

• **New Materials**—Aluminum and plastics continue to challenge the so-called conventional building materials in a larger number of applications. In its "House of Ease" campaign, Reynolds is encouraging builders to offer packages of up to 30 aluminum applications to help the home buyer cut maintenance costs.

Here are some emphasized products: Roofing, siding, gutters, trim, windows, sliding glass doors, foil or foil-wrapped insulation, duct-work, hardware, ventilators, ornamental railing, shower stalls, storm and screen windows and doors, awnings and wall tile.

David P. Reynolds, executive vice president, points out: "Our House of Ease uses 2500 lb of aluminum products."

Malleable Founders Plan Investments

IF YOUR FIRM sells equipment to malleable iron founders, your order book may be heftier this year than last. The industry expects 1959 sales to pick up nearly 20 per cent. Optimism is reflected in spending plans.

Lowell D. Ryan, executive vice president, Malleable Founders' Society, Cleveland, reports that 75 per cent of member companies will invest in capital improvements in 1959.

Members expect to spend more than $6 million for facilities.

Mapping their 1959 buying plans, foundrymen will allocate much of their investment for facilities to produce pearlitic malleable iron. (Its output has soared 480 per cent in ten years.)

Facilities for design and testing will also be in strong demand.

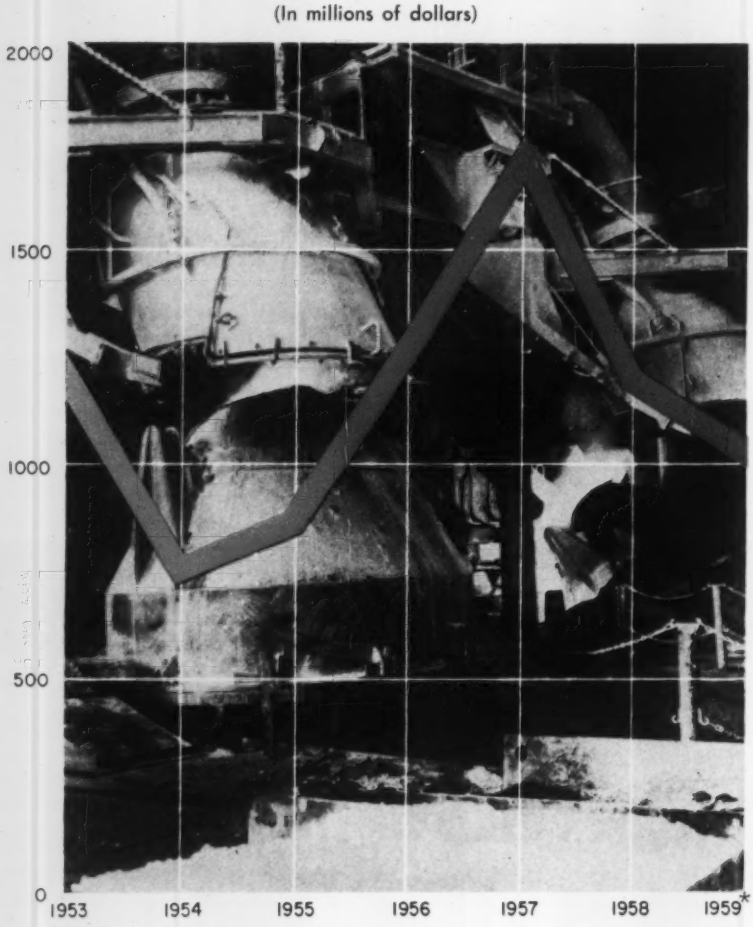
• **Sales Outlook** — Richard W. Crannell, MFS president, announces that association members look for a sales gain of at least 18 per cent this year. Foundrymen anticipate gains of 10 per cent in sales to automakers and 20 per cent advances in other markets. Leading growth areas include road machinery and railroad equipment.

Shipments in 1958 reached an estimated 675,000 tons. A 5 million car sales year in 1959 would boost production to 825,000 tons. Mr. Crannell estimates. A 6 million car year would result in shipments of more than 900,000 tons.

Trademark Trend Up

A rush of applications for trademarks in the last weeks of 1958 sent the yearly total to 21,929, an increase of 539 over 1957, says the United States Trademark Association. Late applications and personnel reductions in the Patent Office dropped total trademark registrations in 1958 to 15,028, vs. 17,234 in 1957.

Steel's Capital Spending To Dip



Source: American Iron & Steel Institute.
*Estimated.

U. S. IRON AND STEEL producers expect to lay out more than $1 billion in capital expenditures in 1959, predicts the American Iron & Steel Institute.

• **Money for Oxygen** — Iron and steel companies spent $1.2 billion for new equipment and construction in 1958, to add 6.9 million net tons to ingot capacity (now 147.6 million net tons). A substantial chunk of this increase will result from installation of new oxygen furnaces in several steelmaking plants, says the institute.

Other capital outlays last year went for new rolling mills, sintering plants, continuous annealing lines, electrolytic tin plate lines, and research laboratories.

• **Depreciation Hit** — Steel executives complain that their capital improvement programs are fighting an uphill battle as long as allowable depreciation rates lag behind costs. They find it necessary to obtain new capital for replacing worn-out or obsolete facilities just to stay even.

Dollar figures shown in the chart represent not only iron and steel production, but merchant pig iron production, coking ovens, annealing and heat treating equipment, and research facilities as well.

Steel Payroll Climbs

The average hourly payroll cost for iron and steel industry wage earners edged up to a record $3.314 during November, 1958, says the American Iron & Steel Institute.

The previous record ($3.274) was set in September, 1958. The cost was $3.241 in October, $3.013 in November. The figures do not include fringe benefits, which amounted to an average 33 cents an hour on an annual basis. Combined hourly and salaried payroll was $306,281,444 during November (30 days), against $326,307,323 in the 31-day month of October, 1958.

Employment rose from 540,590 in October, to 542,464 in November.

Market Research Up 500% Since 1945

FULL TIME market research has increased more than 500 per cent since World War II, says the American Management Association.

Findings in a study of 195 companies doing market research show 40 per cent have annual sales volumes over $100 million, 27 per cent less than $25 million. Three-fifths have at least one full time marketing research employee. More than one-fourth assign the responsibility on a part time basis, often to a line executive rather than a staff executive. Others give the job to an outside agency or divide it.

• **Small Firms Active**—A gradual increase is noted in the number of small companies with personnel in this activity. The number of organized departments in small firms surveyed have increased nearly 300 per cent since 1952. But only 21 per cent of these participants make marketing research full time work, compared with 66 per cent of the medium sized firms, and 88 per cent of the large ones.

The employment of full time marketing specialists is reported with slightly more frequency by makers of industrial products than by consumer goods manufacturers. However, consumer goods makers tend to spend more than do industrial goods manufacturers.

Sales volume is the biggest factor in determining rate of spending on marketing research, the report indicates. Small companies generally have the highest ratios of expenditures to sales.

Wanted: Executives

R&D openings lead the pack, but need slow for marketing and capital goods talent

DEMAND for top executives went up in the last half of 1958, says Executrend, monthly barometer of management openings.

Since a recession low in December, 1957, the over-all demand curve has climbed 49 per cent higher than the July, 1957, level prior to the start of the recession.

"Companies have recently been anxious to locate technical executives with proven administrative abilities in basic research and development where long term returns are realized. This is especially true in chemical and mechanical goods industries," emphasizes Heidrick & Struggles Inc., Chicago, executive recruiting firm which compiles Executrend. A continuing slow demand for capital goods and marketing talent has been noted, however.

Industry has intensified its efforts to replace men who are only average performers. In our competitive economy, firms are more selective. Each search project is increasingly comprehensive.

When comparing January-June, 1958, with July-December, 1958, available jobs increased in all categories listed above except marketing, which was down 5 per cent.

Executive Jobs Available Per Week

CATEGORY	July-Dec. 1958 % change from July-Dec. 1957
Aircraft-electronic engr.	+188
Finance	+ 16
Manufacturing	+ 10
General engineering	+ 7
Marketing	− 6
Personnel	− 10
General administration	− 15
Total	+ 19

Source: Executrend.

Labor, Management Face Rough Schedule in '59

• After a comparatively lean year, labor is flexing its muscles, and management is adopting a get tough policy. So look for rugged bargaining in 1959. Expect productivity to be the key issue in many industries. Defining it will be a major point. Other hot spots: Big wage demands, the shorter workweek, pensions, seniority, more paid holidays, management rights clauses. Here's a timetable on upcoming negotiations that may affect you:

INDUSTRY	UNION	CONTRACT DEADLINE
Steel	Steelworkers	June
Aluminum	Steelworkers & aluminum workers	July
Canmaking	Steelworkers	September
Aircraft	Machinists	December
Aircraft	Auto Workers	March, September & October
Shipbuilding	Metal Trades	June
Shipbuilding	Marine & Shipbuilding	July
Rail Equipment	Steelworkers	August
Rubber	Rubber Workers	April
Copper Mining	Mine, Mill & Smelter Workers	June
Railroads	18 unions	October
Telephone	Communication Workers	February, March & April

Construction Gains

Plant builders enjoy a rising backlog. Prospects are for more growth in inquiries and sales

ANOTHER segment of metalworking is picking up steam. Members of the National Constructors Association, New York (builders of steel, chemical, petroleum, and power producing and fabricating plants), report increased interest in new plant facilities and major modernization programs.

Says the association's president, Carl B. Whyte: "There has been a pickup in sales in the last several months." Another association official reports more prospective work for this time of year than at any time in the last several years.

• **To Boost Efficiency**—Steel producers have stepped up inquiries. Most contemplated projects are to increase efficiency rather than to hike capacity. "Mills are interested in upgrading quality to improve their competitive positions," says one NCA member.

Costs of constructors have fallen in the last year. "Labor productivity is high," says one builder. Reason: More workers are available, so the builder can choose his men more carefully. Charges for equipment have fallen. Raw material costs are down.

The industry expects engineering activity to increase through the first part of the year. It will take longer for construction to gain because of the time lag between engineering and construction in the industrial field.

Opens Metallurgical Lab

Carpenter Steel Co., Reading, Pa., is now operating its new metallurgical control laboratory. The facility covers nearly 10,000 sq ft of floor space on the second floor of the wire mill. It also houses offices for the annealing and wire mill superintendents. Harry F. Ammarell supervises the laboratory.

The company has purchased a 2 acre tract in the Ft. Washington (Pa.) Industrial Park & Office Center as a site for an industrial building. It will be an office and service center for the Philadelphia-Delaware Valley area.

SKF Acquires Firm

SKF Industries Inc., Philadelphia, acquired control of the Reed Instrument Bearing Co., Los Angeles, producer of precision miniature bearings. O. M. Bergethon is general manager of SKF's new division.

Raytheon Splits Division

Raytheon Mfg. Co., Waltham, Mass., created an Equipment & Systems Div. and an Industrial Apparatus Div. from the former Commercial Equipment Div. John H. Beedle heads the Equipment & Systems Div. J. Penn Rutherfoord is manager of the Industrial Apparatus Div.

Sells Perforating Dept.

Assets of Colorado Fuel & Iron Corp.'s Perforating Dept. at the Clinton, Mass., plant of the Wickwire Spencer Steel Div., have been sold to the Fitchburg Screen Plate Co. Inc., Fitchburg, Mass. E. H. Hall, president and treasurer of Fitchburg Screen Plate, and his associates have formed a new company, National Perforating Corp., which will commence operations soon.

Fellows Makes New Line

Fellows Gear Shaper Co., Springfield, Vt., has arranged to manufacture and market the Pfauter line of gear hobbing machines and worm milling machines. The agreement was made with Hermann Pfauter, Hobbing Machine Works, Ludwigsburg, Germany.

Grimm Foundry Closed

The gray iron foundry at Bound Brook, N. J., formerly known as Grimm Foundry Co. has been closed. It was purchased a few months ago by Werblin Bros., Somerville, N. J., which continued operations under the former owner, A. Palmer Grimm.

Mesta Gets Inland Order

Inland Steel Co., Chicago, awarded contracts to Mesta Machine Co., Pittsburgh, covering the design and manufacture of steel strip coiling and handling facilities for the 44 in. hot strip mill at its Indiana Harbor (Ind.) Works. Designed to replace

THE SMOKATRON, manufactured by Summer & Co., Columbus, Ohio, burns more than 120 cars a day. Car enters burning chamber where it's automatically ignited, drawn through the 120 ft chamber by a conveyor chain, then emerges ready for the presses. Precipitators control smoke. Cars are cooled with a water spray upon discharge from machine

facilities, the new equipment will provide fully automatic sequenced coiling, stripping, coil tilting, and coil transfer operations.

Connors Steel Expanding

Connors Steel Div., H. K. Porter Company Inc., Birmingham, is expanding its steelmaking facilities about 25 per cent. Modernization of its Birmingham Works will cost about $500,000, says B. C. Blake, division vice president and general manager. The project includes construction of a pouring building with a 25 ton crane and the installation of pouring car equipment. Early May is the scheduled completion date.

The new facilities will permit simultaneous operation of the plant's three electric furnaces—formerly, the third was used as a spare. A $2.5 million modernization program completed in late 1956 netted the Connors Works an increase in annual ingot tons of about 24 per cent.

CONSOLIDATIONS

Vinson Steel & Aluminum Co., Dallas steel warehousing and marketing firm, is being merged into **Joseph T. Ryerson & Son Inc.**, a subsidiary of Inland Steel Co., Chicago.

Inland Steel Products Co., Milwaukee, purchased **Pacific Metal Decking Co.**, Hayward, Calif. Milcor galvanized steel roof deck will be made in the Hayward plant.

Blaw-Knox Co., Pittsburgh, will purchase **Aetna-Standard Engineering Co.**, Ellwood City, Pa., subject to approval of stockholders.

Merger negotiations are underway between **H. K. Porter Company Inc.** and **National Electric Products Corp.**, both of Pittsburgh. National Electric is a manufacturer of electrical distribution systems.

Miller Mfg. Co., Detroit, purchased **Crawford Steel Foundry Co.**, Bucyrus, Ohio. The Crawford foundry occupies about 80,000 sq ft of floor space and makes steel castings up to 6000 lb. Other Miller subsidiaries are: Buckeye Forging Co., Cleveland; Monroe Steel Castings Co., Monroe, Mich.; Bonney Forge & Tool Works, Allentown, Pa., and Alliance, Ohio; Precision Mfg. Co. and Economy Valve Co., Detroit.

National Automatic Tool Co. Inc., Richmond, Ind., purchased **Jes-Cal Co.**, Fraser, Mich., manufacturer of honing tools. Natco builds multiple spindle machine tools. Officers of Jes-Cal include: Chairman, H. W. Bockhoff; president, N. M. Forsythe; vice president and general manager, C. P. Smith; treasurer, R. C. Schuerman; secretary and assistant treasurer, R. C. Gildenhar. F. J. Jeschke and G. M. Calvert are vice presidents.

Westinghouse Electric Corp., Pittsburgh, purchased S. Heller Elevator Co., Milwaukee. I. L. Heller will be district manager for the Westinghouse Elevator Div. and S. E. Heller will be district service manager.

ASSOCIATIONS

Institute of Scrap Iron & Steel Inc., Washington, re-elected these officers: President, Myron L. Chase, Luria Bros. & Co. Inc., New York; first vice president, M. K. Mahler, Morrow Steel Co., Detroit; second vice president, E. J. Moskowitz, Schiavone-Bonomo Corp., Jersey City, N. J.; treasurer, Harry Marley, Abe Cooper-Syracuse Inc., Syracuse, N. Y.; and secretary, Ralph N. Kopelove, Kopelove Iron & Metal Co. Inc., Dayton, Ohio. S. G. Keywell, Samuel G. Keywell Co. Inc., Detroit, continues as treasurer emeritus; E. C. Barringer continues as executive vice president, and W. S. Story, as director of public relations.

National Insulation Manufacturers Association has been organized with headquarters at 441 Lexington Ave., New York 17, N. Y. Officers include: President, E. H. Luchs, Mundet Cork Corp., North Bergen, N. J.; vice president, R. A. McLaughlin, Pittsburgh Plate Glass Co., Pittsburgh; treasurer, F. T. Christenson, Refractory & Insulation Corp., New York; and executive secretary and director, J. M. Barnhart.

American Foundrymen's Society, Des Plaines, Ill., announces these nominations (election date is Apr. 15): For president, C. E. Nelson, Magnesium Div., Dow Chemical Co., Midland, Mich.; for vice president, Norman J. Dunbeck, Industrial Minerals Div., International Minerals & Chemical Corp., Skokie, Ill.

Lewis Chapman, chairman, William Jessop & Sons Ltd., is the new president of the **British Iron & Steel Federation**, London. Richard F. Summers, chairman, John Summers & Sons Ltd., is president-elect of the federation for 1959.

NEW OFFICES

Wisconsin Steel Div., International Harvester Co., Chicago, opened two district sales offices: At 420 S. First St., Milwaukee, Wis., under E. R. Larsen; and at 421 19th St., Moline, Ill., under J. H. Gray.

Clark Controller Co., Cleveland, established a district office at 18430 W. Seven Mile Rd., Detroit 35, Mich. Joe L. Whitely is branch manager.

NEW PLANTS

Eutectic Welding Alloys Corp., Flushing, N. Y., opened a warehouse service center at 167 Brighton Ave., Boston 34, Mass., under the name of Eutectic Welding Alloys-New England Div. Inc. It will be operated by D. Ryan.

Crucible Steel Co. of America, Pittsburgh, opened a steel service center at 1134 Payne Ave., Erie, Pa., as a subbranch of the Cleveland service center. Stocks will include tool steels, alloys, and stainless steels.

Pittsburgh-Des Moines Steel Co., Pittsburgh, is operating its structural steel and plate fabricating plant near Baltimore in the Curtis Bay area. Personnel include: General manager, A. L. Campbell; sales manager, C. R. Ford; purchasing agent and traffic manager, M. Dierker.

The New Art: Economic Stabilization

THE PRESIDENT'S economic report to Congress this year contains the seed of a new approach to maintaining stability and halting inflation.

An official on the Council of Economic Advisers believes we came close to a real depression last April. He cites housing as the most significant area of support last year but warns that public works spending (which doesn't take full effect for months or even years) is not the best way to fight a recession.

What we learned last year, he implies, should guide us in the fight to halt inflation. He believes the government can accomplish much through better control of its own procurement activities. To do that, a committee will be established under Dr. Raymond Saulnier, council chairman, with members from each of the departments with big procurement interests. The members will devote a major part of their time to the committee. Though they're not "brass," they will have the knowledge of their departments' programs necessary to co-ordinate government purchasing to reduce costs.

Does Uncle Sam Support Inflation?

The point, believes the council official, is that Uncle Sam supports inflation. In some cases, he is the pace setter for cost increases. An example: Restricting imports. When blocking imports, we must ask "searching" questions about the true nature of the program, this official says. In reality, we may simply be boosting prices, not protecting domestic industry. The national security "excuse" for restricting imports deserves "more dogged" analysis, he adds.

In connection with the new art of economic stabilization, Uncle Sam will spend more money in fiscal 1960 on his statistical programs for prices, wages, and productivity. Present statistics are termed "awful." Dr. Saulnier's committee will presumably work under the cabinet level committee recently formed by Ike to study stabilization and inflation.

Subsidization is an area of interest for the committee which is of prime importance to business. Does Uncle Sam really ask the right kinds of questions about costs when he offers to subsidize?

Employment Act Is Set

Part of the stabilization package is Ike's recommendation that the Full Employment Act contain language calling for stable prices as a government goal. The language will be "reasonably stable prices." What that means is anyone's guess, but it will be used, the council official hopes, strictly in terms of "consistent or steady prices and an adequate return on capital invested."

What Congress does about amending the act is, of course, another thing. Unions may seek to lever in what amounts to price control and exact a promise of true "full" employment at the same time.

The danger of committing the government to stable prices is a simple one: "How could we raise taxes, if in turn, prices would be raised to compensate?" Crux: No formula for preservation of the dollar can be set "as long as we play the game of free enterprise." But Uncle Sam, particularly with his own procurement, can wield more influence in the fight against inflation than he has in the past.

Two Democratic Labor Bills Coming

Sen. John Kennedy (D., Mass.) has introduced a labor-management reform bill similar to the Kennedy-Ives Bill of last year. He hopes to get it passed quickly (hearings on it begin this week) without any reference to major changes in Taft-Hartley legislation, which both Democrats and Republicans wish to amend (but in different ways). Then he forecasts a second bill in April recommending Taft-Hartley changes.

He promises that bill will be based on recommendations from the Labor Law Advisory Panel recently set up by the Senate Labor & Public Welfare Committee. Prediction: The senator will have a rough time holding some of his fellow Democrats in line on the first bill. Many are committed to Taft-Hartley changes (particularly repeal of the open shop) as quickly as possible. Neither will some Republicans like Sen. Barry Goldwater (Ariz.) hold still long enough for the advisory panel to come up with its recommendations.

How Much Money for Space?

The budget (see Page 39) is getting a big emotional reaction. Washington could be drowned in a sea of tears. So listen a moment to Dr. Homer Stewart, National Aeronautics & Space Administration's director of planning and evaluation: "Unlimited funds for space programs are not the answer to our problem. It takes time to learn how to spend money," and the U. S. has been spending money on space only a few years. Dr. Stewart implies that some of the money now going for space is wasted by inexperienced personnel and firms. The answer: Continued slow, but sure, development of our capabilities.

Double-checking a slitting order before final palletizing of a finished coil at a J & L Steel Warehouse.

Extra Care at "The Department Store of Steel" helps you meet your production schedules

● When you receive steel that's properly packaged, protected from damage and cut to the right specifications, you know you've saved time—and money.

That's why all J & L warehouse personnel practice *extra care* from the time your order comes in . . . to the time you receive your shipment. This extra care can often make a big difference in your production costs.

J & L warehousemen accurately process your orders to your specifications . . . then ship your orders exactly as you want them . . . where you want them . . . when you want them. This takes extra care, but it saves you time and money. Call your J & L Steel Warehouse for your next steel order. See for yourself how J & L's *extra care* helps you meet your production schedules.

J & L Steel Warehouse Division

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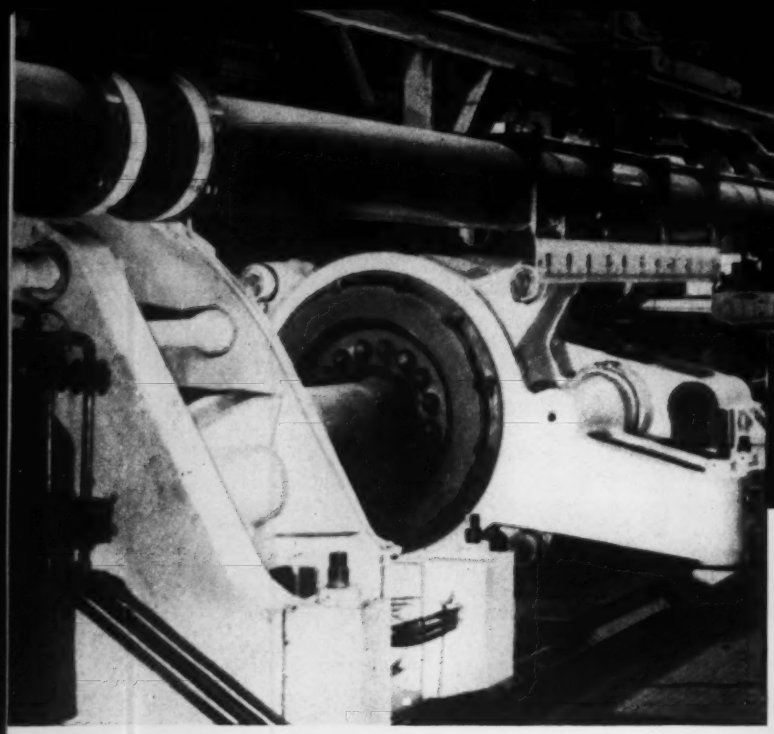
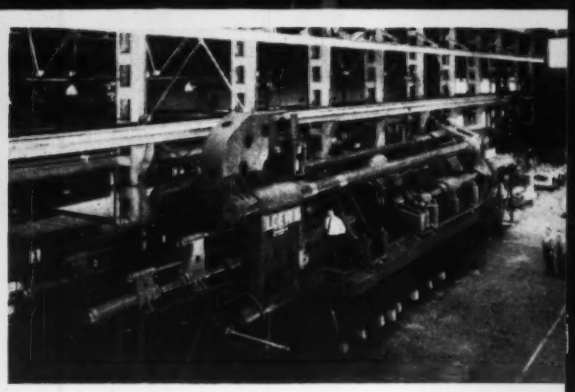


Designed and built by Loewy-Hydropress, this 6000-ton hydraulic extrusion press for light metals and steel is seen in operation at Reynolds Metals' Phoenix, Ariz., plant.



90-ft.-long extrusion press on erection floor.

New and highly automated extrusion press is 10th by Loewy in Reynolds' nationwide organization

Flexibility, power, speed, precision . . . these are the characteristics of a highly automated 6000-ton-capacity extrusion press designed and built by Loewy-Hydropress for the U.S. Navy and operated by the Reynolds Metals Company, America's second largest producer of aluminum.

This new press is designed for maximum concentricity and for easy change from low to high speed without change of valves. One important feature is that it permits changing over quickly from working aluminum to working steel and titanium.

On this Loewy press, substitution of containers, which in conventional extrusion presses requires many hours, can be done in 30 minutes or less. A further feature is a mandrel mover that can be stopped independently of the press movement, and that holds the mandrel stationary in relation to the die. This makes it possible to extrude shapes of unusual design, such as small, hollow configurations which can only be made with specially shaped mandrel tips. A unique device provides for the handling of split dies for step extrusion.

Other features of this advanced Loewy press are these:

- Automated constant speed control
- Automated billet loading system
- Semi-automatic butt and dummy block handling device
- Application of rectangular containers for extremely wide and thin extrusions
- Extrusion of billets up to 50 in. long and 20 in. in diameter into shapes more than 100 ft. long and 16 in. in diameter

Striking evidence of customer satisfaction with Loewy presses is the fact that this machine is the tenth designed and built by Loewy-Hydropress for Reynolds. The same engineering skills that produced it will go to work in your service no matter how large or small the equipment you need. Simply write us at Dept. B-1.

Loewy-Hydropress Division

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111 FIFTH AVENUE, NEW YORK 3, N.Y. Rolling mills • Hydraulic machinery • Industrial engineering

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PORCELAIN ENAMEL:
Where $500 Million Worth Goes

Ranges, cooking equipment, space heaters	30%
Refrigerators and freezers	11
Home laundry equipment and dishwashers	17
Water heaters	4
Plumbing equipment (lavatories, tubs, etc.)	13
Architectural	14
Signs	3
Other	8

Source: Porcelain Enamel Institute.

Seaporcel panels give bank new look

Enamelers Push Ahead

Sales, volume, and competition are up. Porcelain group will devote more attention to aluminum in architectural and nonarchitectural lines. Uses are broadening

PORCELAIN ENAMELING sales may go to $500 million in 1959, estimates John Oliver, managing director, Porcelain Enamel Institute, Washington. Sales totaled $440 million in 1958, $445 million in 1957.

• **More Reaching for Gravy**—The building panel industry is convinced that competitive conditions will carry over from 1958.

Appliance makers with excess capacity are diversifying. Having entered the manufacture of simple panels, long the gravy in the panel field, established panelmakers are showing concern.

• **Building Use Expands**—Architectural enamelers are looking for a bigger share in the 1959 market, about 20 per cent more than they had in 1958. Potential growth in building panels is cited by H. M. Patton, vice president, Ingram Richardson Mfg. Co., Beaver Falls, Pa. Architects designing buildings with curtain walls favor the current trend toward bigger panels and those with three dimensional patterns.

Exterior renovation and interior redecoration will be included in the enameler's bigger share for 1959.

Greatly improved manufacturing facilities are resulting in lower per square foot building costs, making porcelain enamel curtain walls more competitive with other materials, such as masonry, adds M. Jesse Salton, president, Seaporcel Metals Inc., Long Island City, N. Y.

New in architectural enameling is its application to copper spandrels, tower, and spire of a church in Rye, N. Y., for a stained glass effect.

• **Enter Aluminum**—Aluminum is apparently beginning its success story. At present, it probably doesn't account for more than 5 per cent of total volume with less than ten enameling companies using it on a regular basis, but interest is growing. (Advantages: Less weight, no rusting. Disadvantage: Firing temperature must be controlled more closely.) One manufacturer sees a big market for enameled aluminum extrusions for curtain wall construction as column and mullion covers.

Prediction: Enameled aluminum will be used more in the home, but not for home building. Why? Enameled steel or aluminum has always been regarded as too expensive, says one industry official.

Evidence of the trend: Aluminum Co. of America, Pittsburgh, expects to put enameled aluminum bathtubs and sinks into production. Monarch Aluminum Mfg. Co., Cleveland, is enameling cast aluminum frying pans.

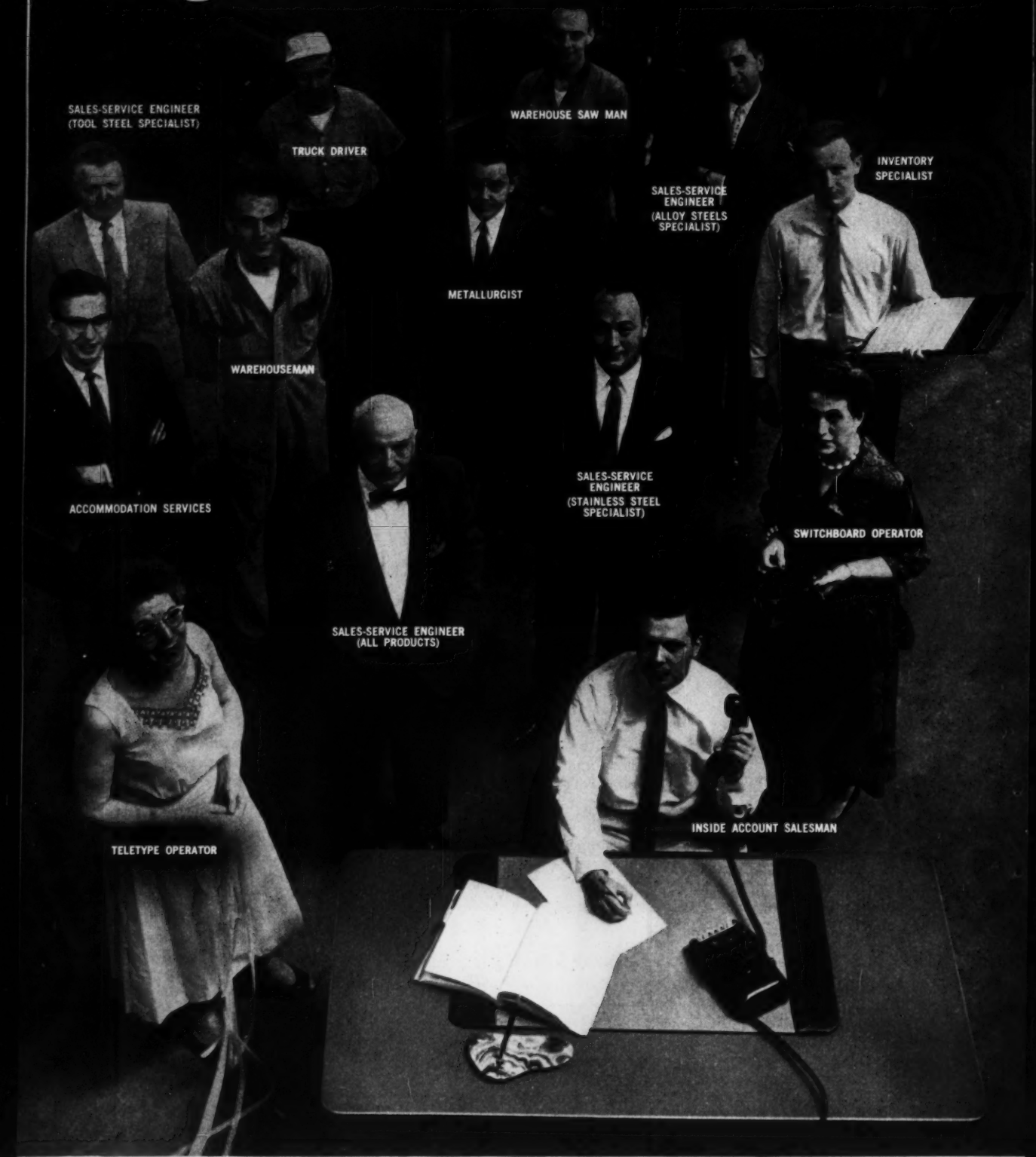
• **Nonarchitectural Enameling** — PEI reports that the home appliance industry, users of over 50 per cent of all porcelain enamel, showed an increase of 6 per cent in September, 1958, over September, 1957. This trend is continuing. One firm reports that its fair sized jobbing operation in enameling agitators and pipelines for abrasion and corrosion resistance held up well in 1958.

• **Prices**—A maker of building panels claims prices "have gone to hell." Despite larger predicted volume in 1959, some people in this field may find the profit squeeze is on.

Competition is expected to keep prices down in the first half. Increased labor and material costs expected in the second half may change the picture.

Ferro Corp., Cleveland, predicts stable pricing for fritmakers unless major upsets take place in raw material costs or labor.

integrated CRUCIBLE steel service



Local Crucible personnel provide service in depth, ranging from quick reports on steels available to expert assistance with metal working problems.

Average warehouse staff is backed up by Crucible Metallurgists who, although located at mills, will travel.

maintains broad range of local customer services

— *ranges from in-stock deliveries to metallurgical research*

Here's *service in depth*, made possible by Crucible's integrated operation. It starts with in-stock deliveries of the steels you need and goes on to provide complete technical assistance for engineers, production, toolroom and maintenance men. And the entire service is available from all of Crucible's 27 warehouses –

(1) *Deliveries from local stocks* of 16,000 specialty steel items, including all grades, shapes and sizes.

(2) *Basic specialty steel data* – complete breakdowns on properties, characteristics, as well as machining and fabrication details. (Warehouse account salesmen can frequently recommend the best steel for the end use.)

(3) *Metalworking assistance* with unusual machining and fabricating problems – by trained, experienced sales-service engineers who specialize in tool steels, stainless, alloys.

(4) *Metallurgical research* – help in developing steels for tomorrow's more exacting applications from Crucible's metallurgists, who will come to your plant on call.

Here's what one purchasing agent recently had to say about this over-all service: "We need lots of help with new steels – ones we haven't used before. The reason we rely on Crucible warehouses is because their men know the answers – or can get them for us quickly."

Why not simplify your own specialty steel purchasing problems by taking advantage of this integrated service? *Crucible Steel Company of America, Dept. PA15, Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

STOCK LIST

Keeps you up-to-date on local stocks of specialty steels. Just ask the Crucible salesman to place your name on the regular mailing list.

One Source For All These Steels

Crucible metallurgists will come to your plant, if necessary, to help engineers use new steels or metals like titanium.

Sales service engineers' experience with fabricating, machining problems can solve toolroom and production problems.

Truck drivers speed orders for overnight delivery to you — or earlier if your order is an "emergency."

TOOL STEELS – Water, oil, air hardening, shock resisting, hot work, plastic and die casting steels in all forms, including bars, sheets, plates, drill rod, hollow bars, forgings and flat ground stocks

HIGH SPEED STEELS – Crucible's famous "Rex"® steels: Rex Thrift Finish rounds, hot rolled and cold drawn flats and squares, drill rod, forgings, sheets, plates, and tool bits

STAINLESS STEELS – Bars, sheet, strip, wire, cold heading wire, metalizing wire, plates, angles

FREE MACHINING STEELS – Crucible Max-el® rounds, hexagons, plates and brake die steel

ALLOY STEELS – Bars, billets, strip and sheet

COLD ROLLED CARBON SPRING STEELS

DRILL STEELS – Hollow and solid drill steels

ALUMINUM EXTRUSION DIE STEELS

HOLLOW TOOL STEEL

Teletype operators get direct reports on quantities available everywhere in the warehouse system — from Crucible's inventory-control computer room.

WELDING AND HARD FACING ROD

PLASTIC MOLD STEELS

PERMANENT MAGNETS

– and many others

CRUCIBLE STEEL COMPANY OF AMERICA

Branch Offices and Warehouses: Atlanta • Baltimore • Boston • Buffalo • Charlotte • Chicago • Cincinnati • Cleveland • Columbus • Dallas • Dayton Denver • Detroit • Grand Rapids • Harrison • Houston • Indianapolis • Kansas City • Los Angeles • Milwaukee • New Haven • New York Philadelphia • Pittsburgh • Portland, Ore. • Providence • Rockford • Salt Lake City • San Francisco • Seattle • Springfield, Mass. • St. Louis St. Paul • Syracuse • Tampa • Toledo • Tulsa • Toronto, Ont.

If you were your boss . . .

How High Would You Score?

Scores for each factor range from a low of 1 to a high of 9 points.

A—HOW MUCH DO YOU KNOW?

1. About your job and its procedures? _____
2. About the company's policies? _____

B—WHAT TYPE INDIVIDUAL ARE YOU?

3. What are your mental and creative abilities? _____
4. What impression does your appearance make? _____
5. What are your personality traits and social mannerisms? _____
6. Are you honest, have integrity? _____

Merit Helps Set Salaries

THE "DOUBT FACTOR" in salary schedules can be an expensive, hidden cost: It cuts a man's performance and increases employment turnover.

The factor manifests itself among employees in these ways:

• "I'm going to ask for a transfer to production. They pay those boys more than they do us research engineers."

• "I'm doing more than any other guy in the department. But what do I have to do to get a raise—root for the union during negotiations?"

Such situations—and they're all too common—point up one of the basic tenets of effective salary administration: Paying salaries equal to or above the area average is only half the job. The individual needs to feel that internal salary relationships are equitable. He also needs recognition for better-than-average performance.

Emphasis on the employee as an individual is a product of our galloping postwar economy which put the spotlight on the middle manager and the engineer—both in short supply and both gaining increasing importance in our industrial complex. The emphasis has provided impetus for the increasing use of job evaluation and slotting techniques (STEEL, Jan. 19, p. 42), has heightened interest in merit appraisal programs, and has created a larger number of parallel opportunities in administrative and technical careers.

• **Here's the Key**—You can lick the "doubt factor" by answering the key question in every employee's mind: "How am I doing on the job?" The job descriptions, used to evaluate and slot positions in their proper relationships, outline what you expect from the individual. Why not carry it a step farther? Set guideposts to measure the individual's performance against those job specifications—devise a merit appraisal program.

You can make your approach to appraisals formal (favored by many large firms) or informal. But whatever the approach, salary administrators emphasize that appraisals are as necessary for personnel as preventive maintenance programs for new equipment.

The objectives:

1. To help the individual grow and to demonstrate the company's interest in him. (Appraisal programs often form the core for management development activities.)

2. To reward the individual for above average performance with pay increases and promotions.

• **Informal Tack**—Evinrude Motors finds the informal approach effective. The firm has no specific "pay increase dates." To encourage supervisors to develop a continual awareness of their subordinates' performance and progress, supervisors must submit merit salary recommendations to a central wage committee which meets monthly.

"Of course, we don't give everybody raises every month," says Clarence Uecke, Evinrude's director of industrial relations. "But we want everybody to be considered so that inequities can be spotted and corrected, and individuals doing outstanding work can be rewarded. If an individual is at or near the top of his rate range, the reviews spotlight the fact. The supervisor then can consider the promotion possibilities: Is the man immediately promotable or does he need special training or experience before making the move upward?"

The central wage committee includes Mr. Uecke and W. J. Webb, division manager. To further develop complete understanding of the program, three supervisors are selected each month to participate in the review. "The whole program has a good communications

C—HOW'S YOUR JOB PERFORMANCE?

7. Do you complete assigned jobs as quickly as possible? ____
8. Are you co-operative and effective in group action? ____
9. How much initiative do you display? ____
10. How willingly do you seek and accept responsibility? ____
11. How's your judgment, ability to size up situations? ____
12. How well do you perform within your budget? ____
13. How willingly do people work for you? ____
14. How effectively do you delegate authority and responsibility? ____
15. What's your record for developing good assistants and successors? ____
16. How much imagination and creativity do you display in meeting difficult problems? ____

What the score means:

144 points—perfect (nobody is)
112 & above—above average

Score ____

effect," Mr. Uecke points out. "The experience of having to back up decisions on why they didn't recommend pay increases, as well as why they did, forces our managers to consider employees as individuals."

• **Takes Other View**—Bell & Howell Co. has developed a formal approach. Managers are required to appraise all subordinates once a year, using forms that list specific factors. The individual's performance is measured by both his immediate supervisor and the one at the next higher level. After the appraisal has been completed and approved by the industrial relations department, the individual and his immediate supervisor discuss it in a private counseling session.

"We emphasize this," says William Hodge, director of industrial relations: "The annual appraisal is primarily aimed at reviewing the individual, his progress, and potential growth with Bell & Howell. The objective—and this is the basic function of the counseling session—is to help him improve his performance and to grow with the company.

"While merit appraisals may have an effect on them, salary adjustments are a continual consideration and are not timed with the appraisals. The basic difference is that merit salary increases are based solely on job performance."

• **Do It Yourself**—A technique Mr. Hodge recommends: Give the employee a form in advance of counseling and have him rate himself. "We have found this an excellent way to prepare the individual for the session," relates Mr. Hodge. "The individual does a little soul searching and experience shows that he's often tougher on his scoring than his supervisor. Discussion of the individual's shortcomings and suggestions for improvement come easier in this type of atmosphere."

Another tip on appraisals is contained in a salary administration survey made by John W. Riegel of the University of Michigan's Industrial Relations Department: Urge managers to keep a continuing record of noteworthy actions by subordinates. Reason: Psychological studies prove memory fails to retain details in their proper perspective.

Along with merit appraisal, new emphasis has been given the policy of providing engineers equal salary opportunities whether they follow technical or administrative careers. Studies show that in the past the best salaries have practically always gone to engineers who became administrators.

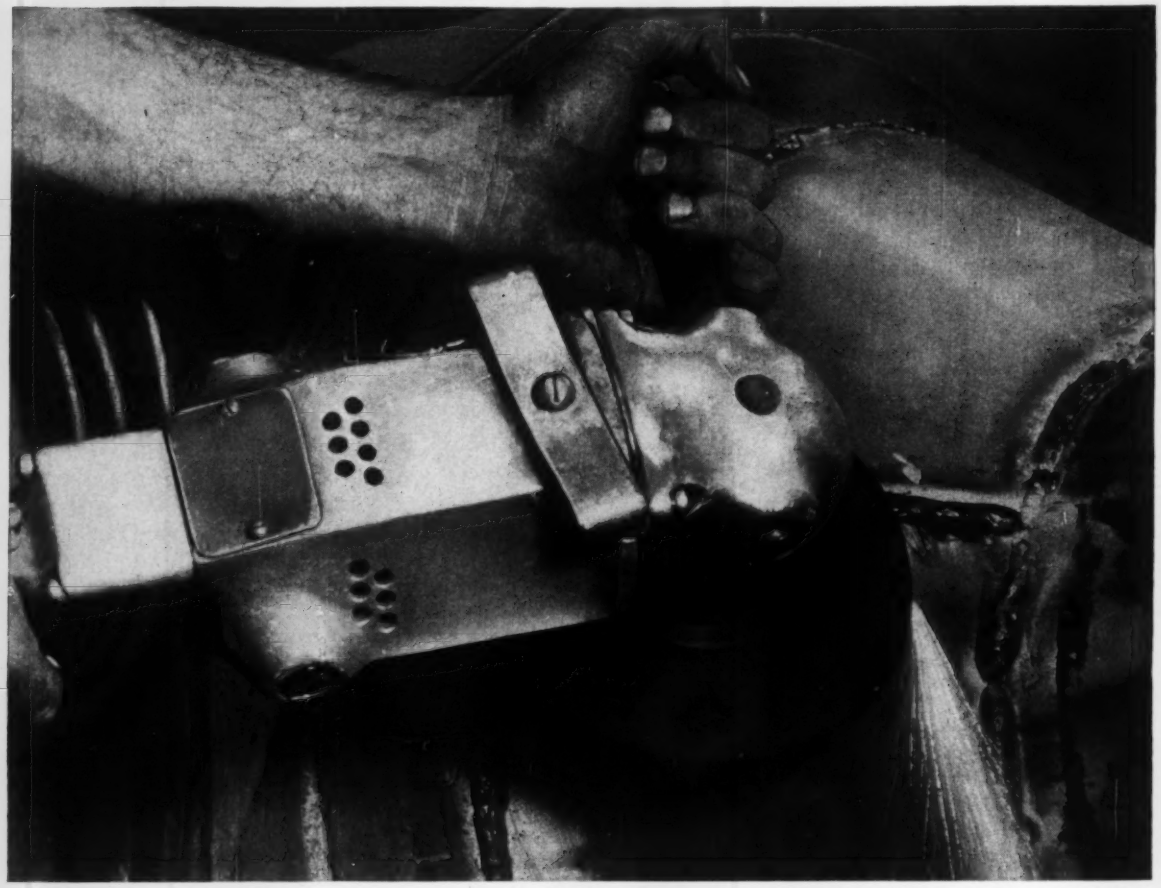
• **Parallel Routes** — Westinghouse has had twin opportunity ladders since the 1920s. Moving from junior engineer to associate engineer, then engineer, brings the individual to a point (usually in five to ten years) where he can elect to follow an administrative or technical career. On the administrative route, he advances from supervising engineer to division or department engineering manager. On the technical side, he may rise from senior engineer to consulting engineer or scientist and make a salary equal to his administrative associates.

For slotting technical personnel, Bell & Howell substitutes two factors in its job evaluation criteria. Replacing "scope of supervision" and "number of people supervised" are "engineering and scientific judgment required" and "creativity required."

"Performance appraisal of technical individuals is inherently too subjective," an engineering vice president admits. "But certainly the attempt is a step in the right direction. We place less emphasis on such factors as articulateness and personality—if he's a poor co-operator, we assign him work involving few contacts. His technical alertness, perception of what needs to be done, and his capacity for self-direction are more important."

• This is the second in a series of three articles on techniques for setting salaries of metalworking managers. The first article appeared last week and the third will be published Feb. 2. An extra copy of any in the series will be available until supply is exhausted. Write to Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

FLEXLITE RAISED HUB GRINDING WHEELS



Safety guard removed to illustrate full view of Flexlite Grinding Wheel

PEAK EFFICIENCY...PEAK STAMINA for high-speed portable grinding

From start to finish, U. S. Flexlite is the wheel that's built to reduce overhead. For smoothing and finishing welds, this is the most efficient, durable wheel in portable grinding. Comes in two types:

A24-H-BWD designed for use where fast rate of removal is the prime objective.

A24-Q-BWD designed for top efficiency and long life. Recommended for heavy-type applications such as heavy-gauge metals and heavy welds.

U.S. Flexlite Raised Hub Wheels are built for the utmost safety—their manufacture is controlled by unerring electronics. Layers of fiber glass reinforce the wheel. These wheels give you a cost-saving advantage right from the start.

• • •

Ask your "U. S." Distributor, or call or write U. S. Rubber, 10 Eagle St., Providence, R. I., or your local "U.S." District Office, or the address below.

Mechanical Goods Division

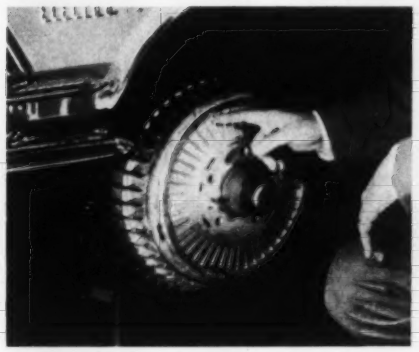
United States Rubber

WORLD'S LARGEST MANUFACTURER OF INDUSTRIAL RUBBER PRODUCTS

Rockefeller Center, New York 20, N.Y. In Canada: Dominion Rubber Company, Ltd.

SAE Looks at Tomorrow's Cars

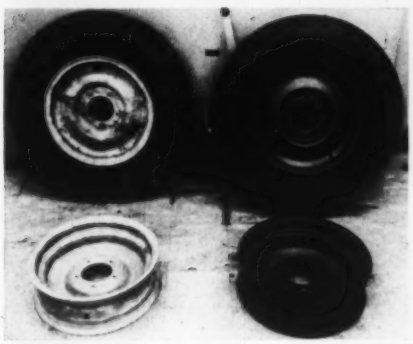
The Society of Automotive Engineers held its annual meeting in Detroit to discuss industry developments that will affect future automobile designs. STEEL was there. Here is a summary of the behind the scenes highlights



BRAKES...Safer, Smoother Stopping

DEVELOPMENTS in metallic linings, water cooled brakes, and molybdenum sprayed drums will obsolete present brake drum systems by the late 1960s. Within two years, you'll be able to buy several makes of cars having integrally cast aluminum brake drums and hubs—but still using organic linings. Buick has them now. Detroit engineers believe this is the least costly approach to the brake problem for the immediate future.

Newell H. McCuen, Chevrolet brake engineer, cites the Pikes Peak constant braking test where ceramic linings held at fairly level line pressures for the 18 mile trip. Organic linings failed at 10.5 miles although they're still adequate for normal car use when combined with heat dissipating aluminum drums and liners.



WHEELS...Plastic Wheels, Universal Rims Here

PLASTIC WHEELS for military vehicles have been developed by Kelsey-Hayes Co., Detroit, and the Ordnance Tank-Automotive Command (OTAC) at Detroit Arsenal. The wheels will be used primarily in hot climates where corrosion is a problem.

The wheels are molded from epoxy precoated glass fiber. Cost is about $6.50, too expensive for commercial use. Ordnance hints the wheels will soon be released for limited use on military Jeeps.

Another Detroit Arsenal development is a universal steel rim to handle tube and tubeless tires (see STEEL, Jan. 19, p. 46). It's being introduced on a replacement basis.

TURBINES...Commercial Turbines Near

THESE TWO DISCS (at left) show the difference between stainless steel and a new high temperature resistant material exposed to 2000° F for 150 hours. Developed by Chrysler Corp., the material contains no strategic or critical elements. It can be used for gas turbine combustion chamber liners, hot gas passages, and other nonmoving parts. It was in Chrysler's gas turbine engine that recently logged 19.4 mpg from Toledo, Ohio, to Woodbridge, N. J.

With material problems out of the way, George Huebner, Jr., Chrysler's executive research engineer, believes these two factors prevent early adoption of gas turbines in passenger cars: 1. Com-

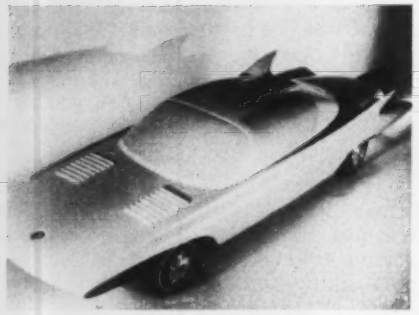
(Material in this department is protected by copyright, and its use in any form without permission is prohibited.)

petitive manufacturing costs. 2. The degree of piston engine improvement to come. Its immediate potential is for military vehicles and trucks.

TRIM...Aluminum on Top, But Pursued

ALUMINUM COMPANIES claim the light metal still dominates the trim field. Aluminum Co. of America, Pittsburgh, estimates one-fifth of the aluminum in 1959 cars is for trim, and 11.1 per cent increase over 1958. Alcoa's figures show that '59 cars are using a total of 51.5 lb of aluminum per car, against 47.3 lb last year.

Aluminum firms now feel the trim market is dependent on styling whims. They're putting more effort in selling functional parts: Housings, engine components, wheels, and brakes. So zinc and stainless steel have more room to compete on the trim market. The zinc people have been playing up the advantages of better finishes.



DREAM CARS...Will Probably Come True

THIS IS CELLA I (at left), De Soto dream car. A. E. Kimberly, chief engineer, says it will be powered by four electric motors, one for each wheel. Electrical energy will be tapped from electrochemical power cells fed by hydrogen and oxygen.

Jack E. Charipar, Plymouth's chief engineer, predicts this for 1980: "Suspension systems may be electromagnetic and automatically adjust to road and driving conditions. Body flaps will brake cars aerodynamically. Car bodies will be lattice frames of lightweight structural members placed where loads require them and covered by stressed panels. Developments in contour milling will permit die patterns and possibly dies to be traced directly from the design models of cars, even from prints."

Automakers Probe Industry's Future

• "The boom running from 1946 to 1958 was built upon innovations generated between 1930 and 1945. Today, we have no backlog of ideas to draw upon. We must propel the next business cycle by our own efforts," charges Stahrl Edmunds, manager of Ford Div.'s Economic Studies Dept. By developing new products and creating new markets for them, he believes industry can spark its own boom before the growing population creates an expanded market in the 1960s.

• Mr. Edmund's boom could be touched off in the Great Lakes area by automakers themselves, judging from figures revealed by Harry A. Williams, managing director, Automobile Manufacturers Association. Of the 113 auto plants built since World War II, 57 manufacturing facilities, six assembly plants, eight engineering and research layouts, and three administration buildings have been established in Michigan, Ohio, Indiana, Wisconsin, and Illinois. Three-quarters of all motor vehicle employment and equipment manufacturing is situated in those states. The region supplies 66 per cent of all goods and services purchased by the auto industry. Residents of the five states buy 23 per cent of all cars built in this country.

Exhaust Notes

• James C. Zeder, Chrysler Corp. vice president, claims these five areas as the most important in future automotive engineering research: 1. Further improvement in engine economy. 2. Reduction in car weights. 3. Increased braking efficiency. 4. Better cooling of car interiors. 5. Improved suspension systems.

U. S. Auto Output

Passenger Only

	1958	1957
January	489,357	641,519
February	392,112	570,650
March	357,049	578,356
April	316,503	548,656
May	349,474	531,413
June	337,355	500,266
July	321,053	495,625
August	180,324	524,363
September	130,426	283,862
October	261,696	327,362
November	514,099	578,600
December	593,926	534,714
Totals	4,243,374	6.115.458

Week Ended	1958	1957
Dec. 20	135,964	140,447
Dec. 27	104,907	79,945
	1959	1958
Jan. 3	97,664	76,653
Jan. 10	133,362	120,140
Jan. 17	134,467†	109,761
Jan. 24	125,000*	107,495

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

How a leading automotive manufacturer Snyder-izes for the Soaring Sixties

HOLDS PISTON WEIGHTS ± 2 GRAMS AT 600 PER HOUR

This Snyder transfer machine automatically weighs die cast aluminum pistons and mills them to tolerances of ± 2 grams at double the rate of the previous method. Here's how it turns out 600 parts per hour:

Pistons are transferred bottoms-up to orienting station.

Pistons are oriented in relation to the wristpin hole offset.

Pistons are spun right side up (below at right) while they are advanced to weighing station.

Precise overweight is transmitted by memory system to weigh-mill station during transfer.

A 3¼" milling cutter removes excess with the piston clamped in position.

Gaging station re-weighs pistons to check weight. Deviation from part tolerances stops machine.

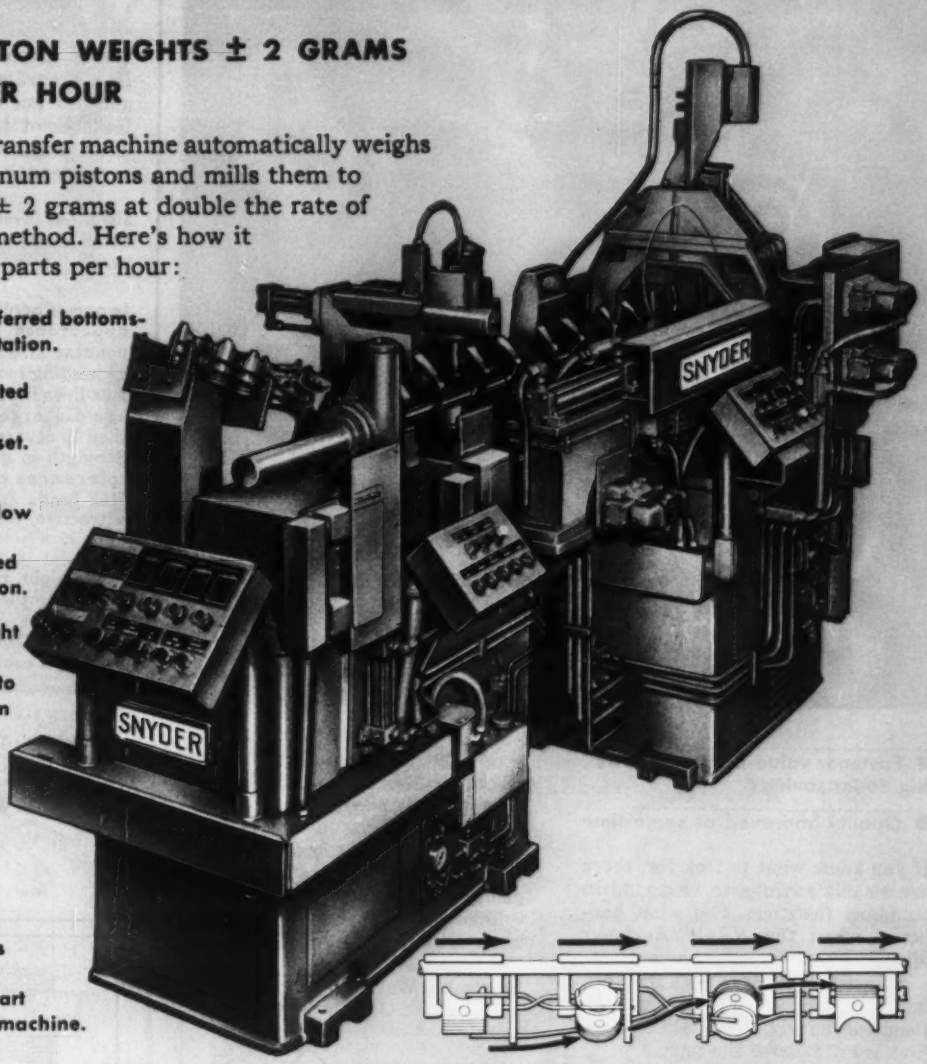
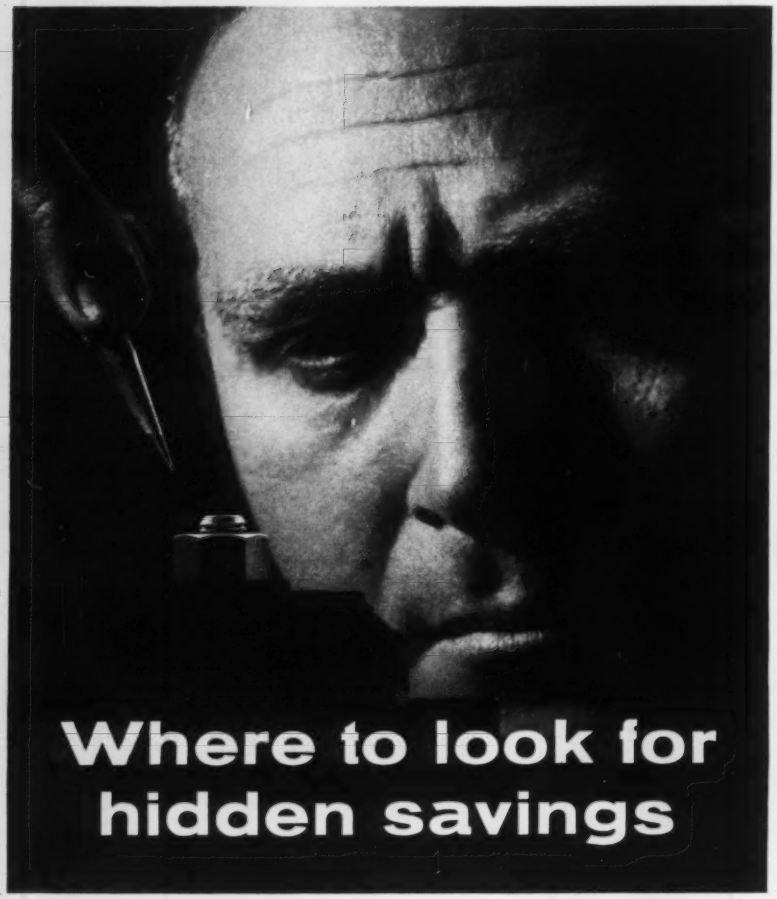


Diagram shows end over end rotation of piston as it passes through spiral rails.

Do your manufacturing cost problems revolve around parts handling, gaging and assembly as well as machining? Ask us to show you the benefits of SNYDER-IZING FOR THE SOARING SIXTIES. For a resume of SNYDER special machines engineered for profit opportunities, send for our new brochure or phone.

SNYDER
CORPORATION
(Formerly Snyder Tool & Engineering Company)
3400 E. LAFAYETTE—DETROIT 7, MICHIGAN
Phone: LO 7-0123



Where to look for hidden savings

- **Fastener value-analysis shows big dollar savings**
- **Quality improved at same time**

If you know what to look for, there are sizable savings to be found in standard fasteners. See what happened when the *RB&W Fastener Man* analyzed fastener usage:

Shown the merits of high strength bolts, a company standardized on them exclusively, saved $12,000 the first year, $28,000 the next.

Showing a manufacturer how to substitute high strength bolts for heavy head milled bolts, the RB&W Fastener Man pointed to a $4,500 annual saving on this item alone.

At a plant with 23,000 different fastener items in inventory, more than half were eliminated...cutting costs from buying to assembly.

Where special fasteners were used in heavy equipment, substituting cap screws offered $13,000 saving on a production run of 500 units.

So it goes. Using high carbon cap screws where costlier socket screws are not really needed . . . cap screws for studs and nuts in certain applications . . . replacing machined parts with cold headed pieces . . . there are plenty of ways to economize.

Take a look at your own fastener usage through the eyes of an RB&W Fastener Man. Contact Russell, Burdsall & Ward Bolt and Nut Co.

R B & W
114th year

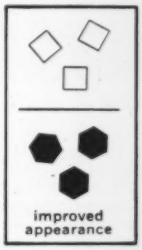
Plants at: Port Chester, N. Y.; Coraopolis, Pa.; Rock Falls, Ill.; Los Angeles, Calif. **Additional sales offices at:** Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas; San Francisco. **Sales agents at:** Milwaukee; New Orleans; Denver; Fargo. **Distributors from coast to coast.**

HEX and HEX: a major step in fastener simplification

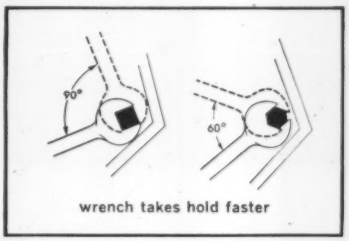
Under the new, RB&W Hex and Hex program, one hex head bolt and hex nut consolidates the best features of four other frequently used fastening units, all of which are intended to do the same job.

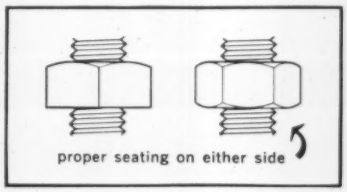
Simplifies inventory, speeds turnover. Streamlines ordering, stocking and usage.

Improves quality and appearance in the popular size range. In heading hex bolts, flow lines in the steel are distorted less than in square bolts. Strength is greater, tolerances closer. Hex heads are more attractive, too.



Cuts weight, reducing handling costs. For example, 1,000 Hex and Hex units in the ½" x 2" size weigh 25 lbs *less* than comparable square head bolts and square nuts.

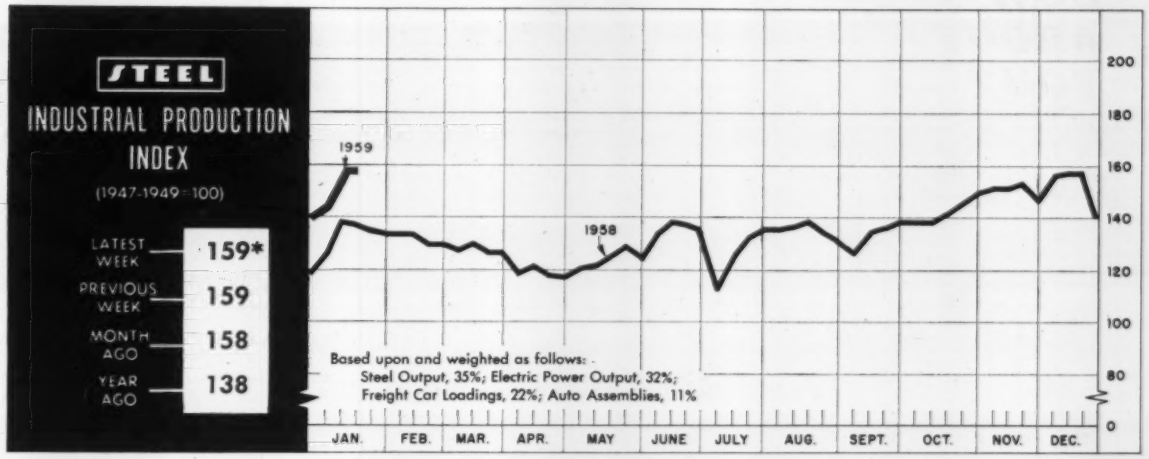




Speeds assembly. Hex permits faster, easier wrenching. Double chamfered hex nuts allow correct assembly from either side.

Cost no more than square head bolts and square nuts. Yet, look at the advantages. Ask the RB&W Man about it. Or, write for Bulletin HH-1.

RB&W FASTENERS—STRONG POINT OF ANY ASSEMBLY



*Week ended Jan. 17.

Recovery Nears 1956-57 Boom Level

COMPARISONS can be misleading. Take a look at STEEL's production index above. It's at a level that would have been judged excellent in 1956. But the pace is barely strong enough to keep many of the nation's shops operating at a profit today.

With the notable exception of some of the capital goods producers, the general economy is near the prerecession level of August, 1957. STEEL's index, at a preliminary 159 (1947-49=100), is 4 points above that peak. It's at the highest level since mid-March, 1957.

• **Source of Power**—Three of the four elements in the index are above the August, 1957, marks. Steelmakers last week scheduled output at 2,140,000 net tons, the fourth consecutive increase since the Christmas week. Auto and truck production has been holding at the 150,000 unit a week pace since the New Year week, although it will decline a bit until Chrysler Corp. can replenish its glass supplies. And electric power output has been breaking records, pushing above 13.5 billion kw-hr in three of the last five weeks.

The only laggard has been railroad freight carloadings, which slipped behind the year-ago figures after making a promising start in early January.

• **FRB Corroborates**—The Federal Reserve Board's production index (see graph and table, Page 60), which is seasonally adjusted, is only 3 points under the previous peak and only 4 points shy of the all-time high point set at the end of 1956. While its climb was slowed down in December, it should continue rising slowly through the first quarter.

So the question is posed: Why is today's pace so slow in comparison with that of 1956?

• **We've Grown** — Today's steelmaking rate is a so-so 75 per cent of capacity, but the tonnage is

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1,000 net tons)[2]	2,147[1]	2,111	1,496
Electric Power Distributed (million kw-hr)	13,500[1]	13,554	12,400
Bituminous Coal Output (1,000 tons)	8,150[1]	6,955	8,790
Crude Oil Production (daily avg—1,000 bbl)	7,100[1]	7,052	6,925
Construction Volume (*ENR*—millions)	$301.6	$260.0	$219.9
Auto, Truck Output, U. S., Canada (*Ward's*)	164,067[1]	165,011	136,505
TRADE			
Freight Carloadings (1,000 Cars)	550[1]	550	572
Business Failures (Dun & Bradstreet)	321	169	324
Currency in Circulation (millions)[3]	$31,710	$32,008	$31,207
Dept. Store Sales (changes from year ago)[3]	+4%	+3%	+1%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$24,918	$23,426	$23,302
Federal Gross Debt (billions)	$282.7	$282.9	$274.5
Bond Volume, NYSE (millions)	$38.4	$38.0	$25.6
Stocks Sales, NYSE (thousands of shares)	21,015	20,838	12,098
Loans and Investments (billions)[4]	$95.4	$96.6	$87.7
U. S. Govt. Obligations Held (billions)[4]	$31.5	$31.9	$26.1
PRICES			
STEEL's Finished Steel Price Index[5]	247.82	247.82	239.15
STEEL's Nonferrous Metal Price Index[6]	217.5	217.3	199.9
All Commodities[7]	119.4	119.3	118.7
Commodities Other than Farm & Foods[7]	127.3	127.3	126.0

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1959, 2,831,486; 1958, 2,699,173. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-39=100. [6]1936-39=100. [7]Bureau of Labor Statistics Index, 1947-49=100.

HOW ABOUT YOU?

Do you know that many cancers can be cured if detected early? That an annual health checkup is your best protection against cancer?

Are you giving yourself this big advantage? Or are you taking chances with your life because of foolish attitudes about cancer like these?

DON'T EVEN MENTION THAT WORD!

Fear keeps some people from even *learning* cancer facts that can save their lives.

NEVER FELT BETTER!

Checkups help to detect cancer in its "silent" stage before you notice any symptom.

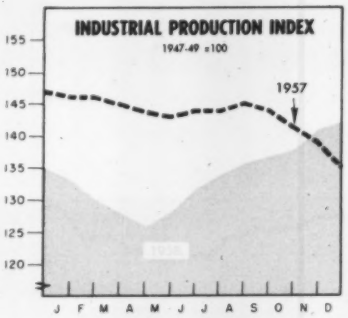
COSTS TOO MUCH!

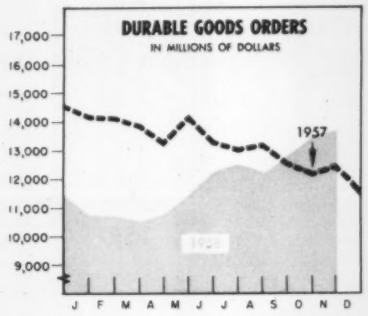
Dollars you spend for the protection of your health can mean years of life.

Millions of Americans have made an annual checkup a habit... *for life.* How about you?

AMERICAN CANCER SOCIETY

THE BUSINESS TREND





(Seasonally adjusted)

	Total Production 1958	Total Production 1957	Primary Metals 1958	Primary Metals 1957	Metal Fabricating 1958	Metal Fabricating 1957
Jan.	133	145	100	143	159	180
Feb.	130	146	95	142	153	180
Mar.	128	145	91	137	150	179
Apr.	126	144	86	134	146	176
May	128	144	91	132	148	175
June	132	145	103	132	151	178
July	134	145	102	132	154	178
Aug.	136	145	109	136	156	178
Sept.	137	144	113	131	155	176
Oct.	138	142	123	128	155	172
Nov.	141	139	123	121	164	170
Dec.	142*	135	123*	107	165*	163
Avg	134*	143	105*	132	155*	175

Federal Reserve Board. *Preliminary.
Charts copyright, 1959, STEEL.

	New Orders* 1958	New Orders* 1957	Sales* 1958	Sales* 1957
Jan.	10,704	14,176	12,646	14,941
Feb.	10,688	14,102	12,038	14,808
Mar.	11,488	13,853	11,670	14,198
Apr.	10,833	13,234	11,532	14,254
May	11,423	14,115	11,643	14,296
June	12,245	13,249	12,086	14,207
July	12,512	13,005	12,256	14,573
Aug.	12,177	13,160	12,385	14,297
Sept.	12,859	12,519	12,723	14,132
Oct.	13,530	12,154	12,943	13,932
Nov.	13,654†	12,434	13,393†	13,548
Dec.	.....	11,399	.....	13,092

Seasonally adjusted. †Preliminary.
U. S. Office of Business Economics.

greater than it was during the period immediately preceding the recession. The rate then was a respectable 83 per cent of capacity. In 1956, the same tonnage was an even more exciting 90-plus per cent. Capacity in other industries has grown just as fast, requiring increasingly higher levels of operations to create a psychologically favorable business climate.

• **We've Progressed** — The new plant and equipment installed after the Korean War gave management the opportunity to find out just what it could do with productivity when the chips were down last year. Result: We can now make more things with fewer people. At the same time, the work force grew from a monthly average of about 67.6 million in 1956 to 68.8 million in 1958. Unemployment is and will continue to be a damper on optimism until production climbs to a level considerably beyond any it has reached so far.

• **We've Changed Emphasis**—The question has often been asked: How far can an upturn go without strong support from capital goods? This may be the year we find out. We've changed our product mix, turning to consumer durables and nondurable goods this year to fill out the capacity we already have. Production of nondurables has played an important part in the recovery of the FRB index.

George P. Hitchings, manager of Ford Motor Co.'s Economic Analysis Dept., summed up the feeling of many businessmen the other day when he said: "Total business activity in physical volume is close to the prerecession level, but there are no dynamic elements in prospect for rapid growth as there were in the recoveries of 1950 and 1955."

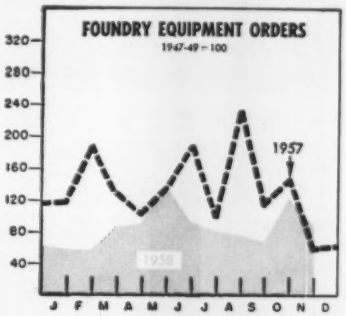
Power Output Hits Peak

The biggest single factor in the recovery of STEEL's production index is the output of electric energy. It is one of the few segments of the economy which is starting the year at record heights.

Officials in the industry point out that there is a natural growth factor which continues to exert itself under almost all economic circumstances. Even in a recession, residential and commercial users of power seldom cut back on consumption. They take close to half of the industry's output. And with new home construction holding above the 1

	1958	1957	1956	1955
Jan.	93.07	126.34	122.43	97.00
Feb.	93.49	139.29	129.56	98.71
Mar.	97.89	140.76	166.14	149.16
Apr.	122.36	132.67	145.20	109.52
May	118.04	157.95	155.53	110.50
June	131.15	121.57	189.13	139.00
July	134.34	128.31	165.50	111.76
Aug.	104.46	110.09	168.70	106.20
Sept.	85.41	116.79	130.35	136.80
Oct.	111.35	124.80	143.38	123.52
Nov.	110.88	87.80	138.50	118.09
Dec.	.....	105.65	117.76	139.85
Avg	.....	124.34	147.68	120.01

Material Handling Institute Inc.



	1958	1957	1956
Jan.	57.9	117.9	195.6
Feb.	57.6	188.4	169.0
Mar.	85.9	127.0	152.7
Apr.	88.7	101.1	135.2
May	136.1	136.2	207.0
June	87.7	187.5	156.7
July	77.9	98.6	110.3
Aug.	74.1	231.3	188.3
Sept.	64.5	113.9	114.7
Oct.	118.9	145.3	122.2
Nov.	83.3	59.6	121.0
Dec.	....	61.4	115.6
Avg	....	130.7	149.0

Foundry Equipment Mfrs. Assn.

million unit mark, a sizable new market is created each year.

Some industry officials doubt the validity of their figures as an accurate barometer of business conditions from week to week. For instance, cold weather over much of the nation the last two months has increased output significantly.

But some officials, notably in the important Central Industrial Div. of the Edison Electric Institute's classifications, claim that the size of the recent upturn shows that industrial consumption has played an important part. One Cleveland official reasons that cold weather in that area has been uniform for several weeks, but power generation has continued to rise. The difference is the solid recovery in the area's industry.

In Detroit, officials say that the industrial load has been stronger than anticipated. It has been directly responsible for small but steady week-to-week gains. In comparison with corresponding year-ago figures, the increases have been running between 13 and 24 per cent during the last three weeks. (Nationally, the improvement has been about 8 per cent.) Detroit Edison Co. officials believe the industrial use of power will continue to show strength during the first half.

Pittsburgh observers claim their power figures have been an accurate barometer of activity in that city's steel mills.

Total consumption is expected to level off for the rest of January, with a moderate decline setting in until June. Industrial use of power will continue to increase but not fast enough to counterbalance the declines in residential and commercial use caused by longer daylight hours and waning winter weather.

Trends Fore and Aft

- Personal income climbed to an annual record of $352.5 billion last year. But the 1.5 per cent gain in disposable income failed to match the 2.5 per cent gain in consumer prices during 1958.
- Over 70 per cent of the respondents to a survey by the New England Council believe that both sales and profits in 1959 will be better than they were in 1958.
- Defense electronic purchases during the first quarter of the 1959 fiscal year dropped to $958 million, compared with $1.187 billion in the previous quarter, says the Electronic Industries Association.

IT'S NOT "HOW THIN"

→ 0/8

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With the recent trend in strip metal towards thinner and thinner gauges, Somers, a pioneer in thin strip for nearly 50 years, is naturally among the leaders in rolling *ultra-thin* strip. But in addition to rolling production quantities of strip as thin as can be obtained anywhere in the world, Somers utilizes exclusive techniques and equipment to make sure that every foot of metal is up to the most exacting standards.

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3. Experience exclusively with thin strip metals gives Somers an unmatched background in engineering *ultra-thin* strip to meet all special requirements.

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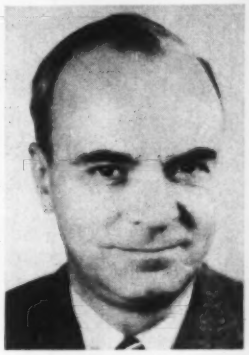


MALCOLM B. ANTRIM
Lukens Steel engineering post

RALPH M. TRENT
Pangborn president

A. T. WAIDELICH
Austin eng. & res. director

Anker G. Christensen was appointed director of manufacturing, **Read Standard Div.**, Capitol Products Corp., York, Pa. He was formerly executive vice president, Hightower Morse & Co., and president of Spencer Clutch Co.

Malcolm B. Antrim was promoted to manager-engineering and construction, **Lukens Steel Co.**, Coatesville, Pa. Associated with Lukens since 1941, he most recently was project manager on its $33 million expansion program.

Robert L. Felt was appointed product metallurgical engineer in **Crucible Steel Co. of America's** Metallugical Div., Pittsburgh. He was assistant chief metallurgist at the Midland, Pa., Works. **F. L. Moffet**, former chief metallurgist, Park Works, Pittsburgh, was named material and process engineer (conversion and treatment), Metallugical Div.; and **A. P. Terrile** was appointed field service metallurgist.

Pratt & Whitney Co. Inc., West Hartford, Conn., named **James H. Daley** sales manager, Machine Tool Div. He assumes the post held by **James D. Allan**, who will serve as a sales consultant until retirement in July. In the field sales force of P&W, **George A. Crittenden**, former manager of the Philadelphia office, was named New York district sales manager, heading cutting tool and gage sales activities. He is succeeded in Philadelphia by **Victor H. G. Wadlund. Donald A. Heaton** was named district sales manager, cutting tool and gage sales, Philadelphia territory.

Ralph M. Trent was elected president of **Pangborn Corp.**, Hagerstown, Md., succeeding the late **Victor F. Stine.** Mr. Trent was executive vice president. Prior to 1957, he served for ten years as west coast district manager.

Harvey N. Stover was made assistant vice president, industrial sales, **Gould-National Batteries**, Trenton, N. J.

Clark D. Matthews was elected president, **Standard Buffalo Foundry Inc.**, Buffalo. He succeds his father, **Charles D. Matthews**, who will serve temporarily as a consultant.

Henry Harnischfeger was elected president and treasurer, **Harnischfeger Corp.**, Milwaukee. He succeeds his father, **Walter**, who is now chairman.

Sales appointments in **Allis-Chalmers Mfg. Co.'s** Detroit district include: **Earl R. Narum**, manager of automotive industry sales; **Roy E. Goodwill Jr.**, manager of general industrial sales; **Kenneth Womelsdorf**, assigned to the district as a sales representative.

Ralph Emch was elected president, **Schultz Die Casting Co.**, Toledo, Ohio, to succeed **R. A. Luedtke**, resigned. Mr. Emch was vice president.

T. H. T. Brady was promoted to assistant Chicago district sales manager for **Jones & Laughlin Steel Corp.** He was assistant manager, Cold Finished Bar Products Div., Pittsburgh.

Austin Co., Cleveland, appointed **A. T. Waidelich** (vice president) as director of engineering and research, succeeding **J. K. Gannett**, retired. **Allan S. Austin**, president, succeeds **George A. Bryant**, chairman, as chief executive officer. **Hamilton Beatty** was elected a vice president, continuing as manager of sales development. **D. H. Kempler**, general auditor, was also elected a vice president.

W. B. Ilko was made sales manager, Wright Hoist Div., York, Pa., **American Chain & Cable Co. Inc.**, succeeding **S. J. Woodworth.** Mr. Ilko continues as sales manager, American Chain Div. **T. J. Winter** fills the new post of field sales manager, Wright Hoist Div.

American Brake Shoe Co.'s Kellogg Div., Rochester, N. Y., appointed **Max W. Kistler** vice president in charge of aircraft hydraulic products.

Samuel K. Scovil was appointed manager, Ore Sales Dept., **Cleveland-Cliffs Iron Co.**, Cleveland. He was assistant manager.

Randolph L. Ruhley was made vice president and general sales manager, **Branford Co.**, New Haven, Conn.

Dr. G. B. Cooper was appointed research supervisor for **Jones & Laughlin Steel Corp.**, Pittsburgh.

Dr. Patrick Conley was made manager of **Westinghouse Electric Corp.'s** Air Arm Div., Baltimore. He succeeds **Dr. S. W. Herwald**, recently named vice president-re-

JOSEPH L. BLOCK PHILIP D. BLOCK JR. JOHN F. SMITH JR.

top management team at Inland Steel Co.

search. Dr. Conley was technical director on the defense products group headquarters staff.

Inland Steel Co., Chicago, elected **Joseph L. Block** chairman and chief executive officer. He was president and chief executive officer. Named vice chairman was **Philip D. Block Jr.**, former senior vice president-raw materials. **John F. Smith Jr.**, former vice president-sales, was elected president. **Hjalmar W. Johnson** was named vice president-planning and research. Succeeding him as vice president-steel manufacturing is **Francis M. Rich**, former general manager of its Indiana Harbor Works. Named vice president-sales was **Robert M. Buddington**, former general manager of sales. **Lemuel B. Hunter**, former assistant to the president was appointed vice president-administration. **Carl B. Jacobs** was promoted to vice president-raw materials from general manager-raw materials.

James O. Alexander fills the new post of market manager, packaging machinery, **Reynolds Metals Co.**, Richmond, Va. He joined Reynolds six months ago as assistant manager, baking and milling market, Packaging Div., and previously was product sales manager for the Avion Div., American Car & Foundry Industries.

George B. Miller fills the new post of vice president-operations, **Racine Hydraulics & Machinery Inc.**, Racine, Wis. He was vice president-engineering.

AC Spark Plug Div., Flint, Mich., General Motors Corp., appointed **John T. Rausch** assistant chief engineer in charge of the motor group of products. He succeeds **Dr. Wilfred A. Bychinsky**, recently made chief automotive engineer at AC.

Falk Corp., Milwaukee, appointed **George P. Maurer** director of gear engineering; **W. Stephen Richardson**, chief engineer; **Edward J. Wellauer**, director of research and development. **Walter P. Schmitter**, former vice president and chief engineer, was elected vice president-engineering.

Frederick G. Brown was named assistant vice president-sales, **Weirton Steel Co.**, Weirton, W. Va., division of National Steel Corp. He was assistant to the vice president-sales.

Farrel-Birmingham Co. Inc. appointed **Raymond H. Perkins** west coast manager, with offices in Los Angeles. He succeeds **Paul R. Oliver**, retired.

James A. Parsons was elected president, **Ward Steel Co.**, Cambridge, Mass., succeeding **Asline Ward**, retired. **Eldredge H. Allbee** and **Linwood E. Palmer Jr.** were named vice presidents.

R. E. Calhoun was promoted to manager of mining operations for **American Zinc, Lead & Smelting Co.**, St. Louis, and all operating subsidiaries. He was western manager. He has offices in Knoxville, Tenn.

Jacob W. Banks was made superintendent of blast furnaces at Indiana Harbor Works, East Chicago, Ind., **Youngstown Sheet & Tube Co.** He succeeds **J. F. Agerter**, who became superintendent of blast furnaces at the South Chicago, Ill., Works when **H. J. Draine** took another assignment because of health.

Oscar E. Rothfuchs was made manager of works of the Michigan City, Ind., freight car plant of **Pullman-Standard Car Mfg. Co.** He succeeds **Paul F. Behn**, retired.

James A. Holloway was appointed manager, tin plate sales, **Wheeling Steel Corp.**, Wheeling, W. Va.

Walter A. Hensel was elected president, **DataGraphic Systems Inc.**, Santa Monica, Calif. A new corporation, it was formed as an alliance between Douglas Aircraft Co. and General Aniline & Film Corp. to develop new techniques, processes, and systems in the microfilm and reproduction field. Mr. Hensel is vice president-general manager, Ozalid Div., General Aniline. Other officers of DataGraphic include **Russell S. Ellsworth**, formerly of the Ozalid Div., as vice president and general manager; **Francis Nivens** and **J. Edwin Coates** (of Douglas) vice presidents.

J. Louis Reynolds was elected vice president and assistant to the president, **Marquardt Aircraft Co.**, Van Nuys, Calif.

Ralph T. Mueller was made midwest regional sales manager, Socket Screw Div., **Bristol Co.**, Waterbury, Conn. He is in St. Louis.

William Curto, superintendent of the Niagara Falls, N. Y., plant, **Electric Auto-Lite Co.**, was made plant manager in Atlanta.

Youngstown Sheet & Tube Co., Youngstown, promoted: **Robert W. Walling** from assistant manager to manager of high strength steel sales; **Roy A. Curl** from manager of sales promotion to manager of sales promotion and advertising. **Robert B. Davidson**, of the Cleveland district sales offices, was made assistant manager-high strength steel sales.

E. L. Goff, executive vice president, was made senior vice president at **Associated Spring Corp.**, Bristol, Conn. **W. E. Froehlich**, vice president-marketing and research and development, was made vice president-engineering. **F. E. Crist**, director of industrial relations, was made director of administration. Mr. Goff will represent the company in civic and legislative affairs, and will keep officers and corporate staff abreast of business and polit-

SAFETY SWITCHES STAND UP UNDER 100,000 AMPERE SHORT CIRCUIT TEST!

INDEPENDENT TESTING LAB RELEASES FINDINGS AFTER GRUELLING "TORTURE RACK" TESTS

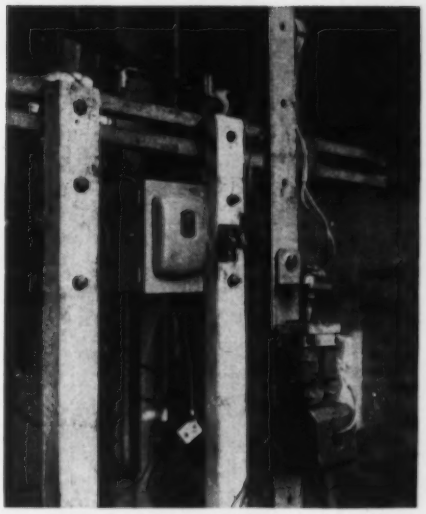
Unprecedented tests have been completed on 30 through 600 ampere rated Square D safety switches equipped with high capacity current limiting fuses. During these tests, switches were closed on a short circuit system delivering up to 100,000 amperes (symmetrical—R.M.S.). In addition, the fault was applied on the closed switches. *All switches withstood the shocks without any sign of failure!*

High Capacity Systems Demand Stamina

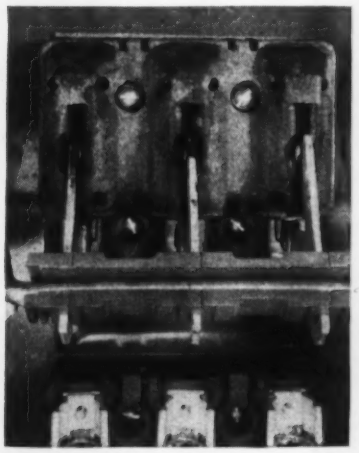
High capacity systems capable of delivering tremendous short circuits are becoming more and more prevalent with the growth of electrical loads. Network systems in metropolitan areas are a source of such faults. Another, the heavy industrial areas, with a concentration of sub-stations and rotating machinery. Terrific stresses and heat generated by such faults are serious hazards to both personnel and equipment unless properly contained. That is why proven protection for switching service and feeder circuits is of major concern.

Square D Standard Switches Do The Job

These tests offer conclusive proof that standard Square D Type HD and Type ND switches, equipped with high capacity current limiting fuses, can be used on such systems without fear of failure. You pay no premium for the proven performance they offer. Why settle for less?



Square D switch on "torture rack" during test involving up to 100,000 ampere short circuit



At left • No sign of failure in this switch interior after 100,000 ampere short circuit test

SUMMARY TABLE • Extract from Report No. 5/NA R66—Sheet No. 5

Ampere Rating	Voltage Rating	Catalog Number	Average Symmetrical Prospective Current R.M.S.	Recovery Voltage R.M.S.	Maximum Total Arcing Time	Fuse Type
30	250	A85351	96,600	252	.0009	A2Y-30A
30	250	A85351	96,400	253	.0010	FRN-30A
30	600	A85341	107,000	590	.0020	A6Y-30A
30	600	A85341	106,000	601	.0027	FRS-30A
60	250	A86352	96,400	248	.0010	A2Y-60A
60	250	A86352	95,200	252	.0019	FRN-60A
60	600	A86342	106,000	605	.0011	A6Y-60A
60	600	A86342	108,000	598	.0020	FRS-60A
60	600	A86342	107,000	601	.0013	NAS-60A
100	250	A86353	95,200	253	.0009	A2Y-100A
100	600	A86343	108,000	604	.0014	A6Y-100A
200	250	A86354	95,200	253	.0037	A2Y-200A
200	600	A86344	107,000	602	.0011	A6Y-200A
400	250	A86355	95,900	252	.0039	A2Y-400A
400	600	A86345	106,000	611	.0050	A6Y-400A
600	250	A86356	94,500	251	.0062	A2Y-600A
600	600	A86346	107,000	601	.0062	A6Y-600A

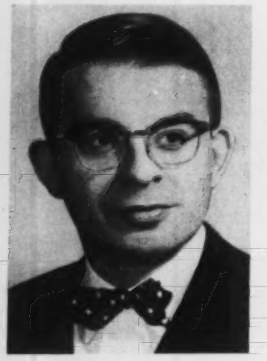
Above • Extract of Nelson High Power Laboratory Report C/NA-66

SQUARE D SAFETY SWITCHES GIVE YOU *Certified* PERFORMANCE!

SQUARE D VISIBLE BLADES you can SEE you're safe!

EC&M HEAVY INDUSTRY ELECTRICAL EQUIPMENT...NOW A PART OF THE SQUARE D LINE

SQUARE D COMPANY



B. ARTHUR RUSSELL
Drying Systems president

JAMES C. EATON
Latrobe v. p.-operations aide

WILLIAM E. THOMAS
United Engineering mgt. post

ROBERT H. HENKE
Republic Steel district post

ical matters affecting interests of the company.

B. Arthur Russell, executive vice president, was elected president and treasurer, **Drying Systems Co.,** Chicago, a division of Thor Power Tool Co. He succeeds **Buford B. Russell,** who becomes chairman of Drying Systems after 24 years as its president and general manager. **Russell H. Burgess** was elected vice president in charge of the Air Conditioning and Cool-Heat Dept.; **David Weissman,** vice president in charge of the Food Processing Dept.

Lovell Shockey was made sales manager, Cleveland Works, **National Malleable & Steel Castings Co.** He succeeds **Donald L. Griffith,** who was made sales co-ordinator. Mr. Shockey was development engineer, Industrial Div.

Lawrence C. Rodgers Jr. was made product manager, special metals fabrication, at **Pfaudler Co.,** Rochester, N. Y., a division of Pfaudler Permutit Inc.

James C. Eaton was named assistant to the vice president-operations, **Latrobe Steel Co.,** Latrobe, Pa. He was formerly production superintendent of the Laminations Dept., and served as staff assistant to the works manager, Brackenridge, Pa., Works, Allegheny Ludlum Steel Corp. **Robert V. Peterson** was named Detroit district manager.

William E. Thomas was made assistant to the vice president-operations, **United Engineering & Foundry Co.,** Pittsburgh. He was manufacturing assistant.

Stanley C. Killian was appointed vice president and general manager, **Delta-Star Electric Div.,** H. K. Porter Company Inc., Chicago. He served on the division executive staff for six years, most recently as vice president and assistant general manager, and previously as chief engineer. **C. Stuart Beattie,** who for the last eight years operated Delta-Star, continues in a part-time consulting capacity.

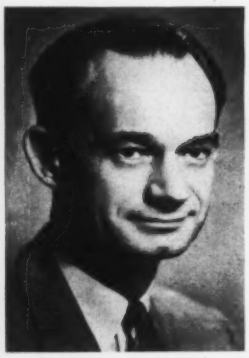
Robert H. Henke was made assistant manager of **Republic Steel Corp.'s** central alloy district (Canton and Massillon, Ohio). He was manager of quality control at Allegheny Ludlum Steel Corp.'s Brackenridge, Pa., Works, in charge of technical operations.

F. Harold Williams was made general manager of the newly created Hornell, N. Y., Div., **SKF Industries Inc.,** a plant formerly operated as a unit of SKF's Mfg. Div. Mr. Williams was manager, Railway Sales Dept.

William M. Maki was appointed chief engineer, Electrical Contacts & Specialties Div., **Fansteel Metallurgical Corp.,** North Chicago, Ill. He was supervisor of process engineering.

National Tube Div., Pittsburgh, U. S. Steel Corp., appointed product managers: **James P. Bacon** was made manager-tubing specialties products; **James H. Degnan,** manager-oil country tubular products;

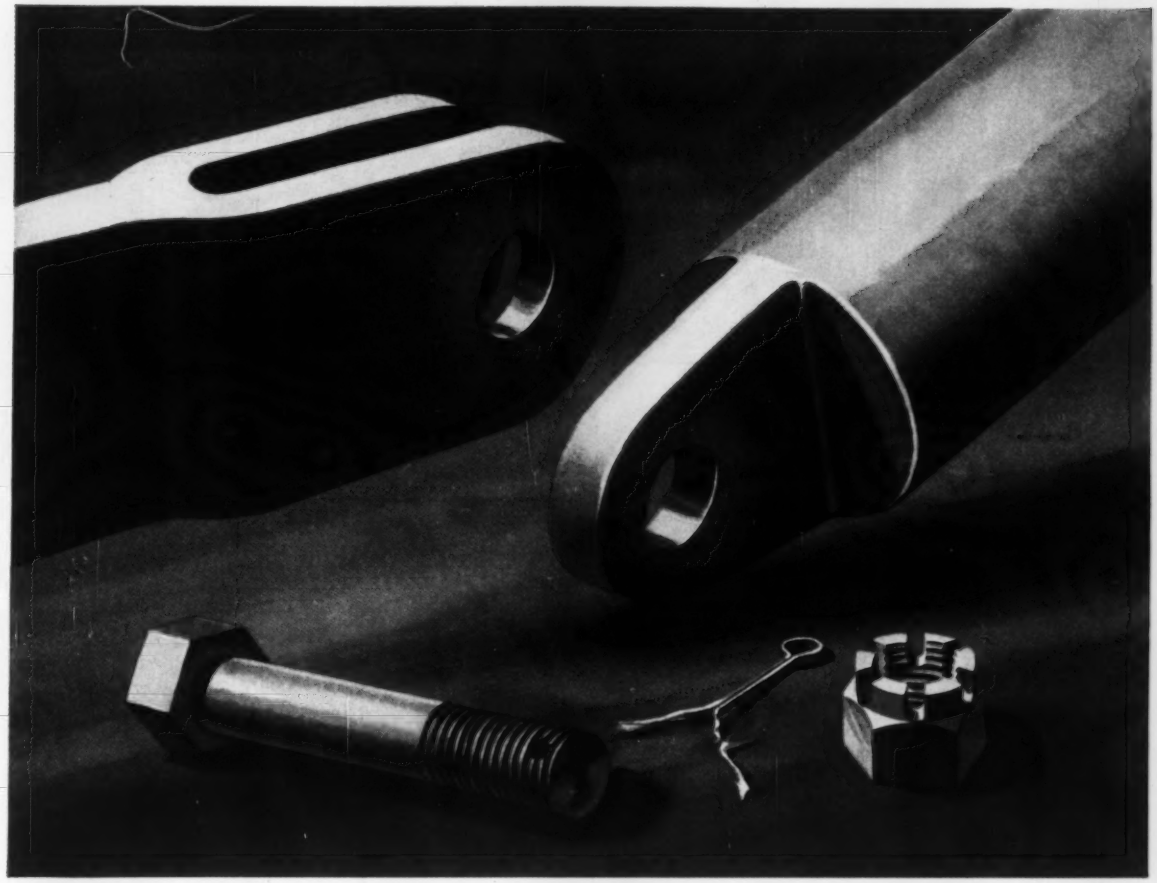
LAWRENCE C. RODGERS JR.
Pfaudler product manager



STANLEY C. KILLIAN
Delta-Star v. p. & gen. mgr.

F. HAROLD WILLIAMS
SKF div. general mgr.

WILLIAM M. MAKI
Fansteel div. chief engineer



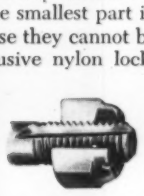
Somebody saved 1/4¢ on this fastening

But something was missing when costs for the castellated nut and cotter pin unit were figured. The extra expense of field service calls; the cost of "downtime" to the customer; the value of your company's reputation as a manufacturer. Add these factors in . . . then the one quarter cent for the **double dependability** of an Elastic Stop nut becomes the lowest cost insurance you can obtain for the protection of your equipment and your reputation.

No component, part or material which fails under the stresses of normal product performance can be economical . . . no matter how low the initial cost. Failure of the smallest part is failure of the equipment.

Because they cannot be shaken loose . . . because the exclusive nylon locking insert retains original locking torque throughout the most rugged operating conditions – Elastic Stop nuts insure against breakdowns through fastener failure. And, because Elastic Stop nuts eliminate the possibility of product failure caused by loosened fasteners . . . *they are truly the most economical fasteners available.*

For detailed photos showing how some of America's foremost manufacturers of heavy equipment have insured critical bolted connections with Elastic Stop nuts on such units as rock drills, scrapers, snow plows, off-the-road trucks . . . write to ESNA. Or, for first hand proof, tell us the preferred size and we'll send you test samples. Address: Dept. S24-160, Elastic Stop Nut Corporation of America, 2330 Vauxhall Road, Union, New Jersey.



DOUBLE DEPENDABILITY

The dependability built into every Elastic Stop nut builds itself into the dependability of every product on which it is used.

ELASTIC STOP NUT CORPORATION OF AMERICA

ESNA

RAYMOND C. BLAYLOCK GIFFORD K. JOHNSON
Chance Vought management positions

HARRY C. SOUKUP EDWARD F. WOYTYCH
Giddings & Lewis div. executives

George O. Nations, manager-standard pipe products.

Chance Vought Aircraft Inc., Dallas, appointed **Raymond C. Blaylock,** former vice president-engineering, to the post of vice president and general manager. **Gifford K. Johnson,** former vice president-production, was elected president of Genesys Corp., Los Angeles, a subsidiary, and vice president-business planning for Chance Vought.

V. W. Copcutt was made marketing manager, **Research-Cottrell Inc.,** Bound Brook, N. J. He was assistant manager, product engineering.

Harold Brown was appointed general sales manager of **Walworth Co.,** New York.

William R. Baker was appointed quality control manager for the Montebello, Calif., plant of **Western Design,** a division of U. S. Industries Inc. He was director of quality control for Parker Aircraft Co.

Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., appointed **Harry C. Soukup** general manager and **Edward F. Woytych** works manager for its Fond du Lac Div. Mr. Soukup was works manager and acting general manager. Mr. Woytych was assistant works manager.

Harvell Mfg. Corp., Hubbard, Ohio, named **W. D. Robertson** executive vice president; **J. T. Kiernan,** sales manager, was named vice president-sales, succeeding Mr. Robertson. **T. F. Cowley,** plant manager, was named vice president-manufacturing.

Gerald J. Pruitt was appointed purchasing agent of **Stran-Steel Corp.,** division of National Steel Corp. Purchasing is at Terre Houte, Ind.

Dwight A. Wrigley was made assistant general manager, **Riverside-Alloy Metal Div.,** Riverside, N. J., H. K. Porter Company Inc. He succeeds **J. C. Hydrick,** who now heads Porter's Disston Div. Prior to joining Porter late in 1958, Mr. Wrigley was chief engineer for Narragansett Wire Co.

John W. Brennan was elected president of the newly formed Industrial Div., **American Radiator & Standard Sanitary Corp.,** New York. He was formerly president, American Blower Div., and now has headquarters in Detroit. Other appointments to the new division: **Richard S. Reade,** vice president-manufacturing (former president, Ross Heat Exchanger Div.); **Elbert M. Palmer,** vice president-customer relations (former president, Kewanee Boiler Div.); **Edwin W. Petersen,** vice president - marketing; **Richard L. Bernhard,** vice president-engineering; **Townsend Tinker,** vice president-technical development; **Wells A. Gardner,** vice president, works manager.

Leslie N. Schuman was named head of a new product engineering department of the Industrial Div. of **National Malleable & Steel Castings Co.,** Cleveland. Succeeding

WILLIAM R. BAKER DWIGHT A. WRIGLEY
Western Design post *Riverside-Alloy asst. gen. mgr.*

GERALD J. PRUITT LESLIE N. SCHUMAN
Stran-Steel purchasing agent *National Malleable post*

him as general superintendent of the Cleveland Works is **Charles Schneider.**

O. M. Bundy was named manager, New Products Div., **Clark Controller Co.**, Cleveland. The new position is in addition to his present duties as director of research.

Anthony J. Malisek, former assistant to the vice president-procurement, **Bridgeport Brass Co.**, Bridgeport, Conn., was named director of purchases.

I. J. Karassik was appointed consulting engineer and manager of planning for **Worthington Corp.'s** Harrison, N. J., Div. Former consulting engineer and assistant to vice president, he will act as consulting engineer to all departments in the Harrison Div.

Duro Co., Dayton, Ohio, elected as vice presidents **Jack W. Graef,** now vice president and general manager; and **Charles L. Albright,** now vice president, treasurer, and assistant general manager. **John T. Conard** was made director of purchases; **Elmer A. Davis,** merchandising manager, Water Conditioning Div.

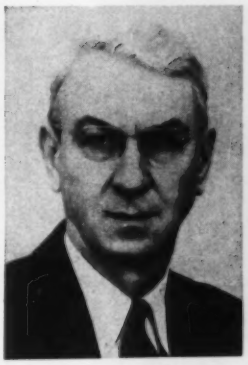
Howard F. Carver was named assistant general manager of **Gleason Works,** Rochester, N. Y., a new post. He continues as vice president-sales.

Emmett J. Heup was appointed manager of purchases for **Bucyrus-Erie Co.**, Milwaukee, succeeding **John R. Warner,** recently made vice president-purchasing.

A. R. Baldwin fills the new post of general sales representative for **Republic Steel Corp.** He continues to operate from the Birmingham district sales office, but is available to assist all of the company's divisions and districts.

Nicholas A. Cruger was appointed executive vice president, **Marcus Transformer Co. Inc.**, Rahway, N. J.

Clarence E. Griese was elected president and general manager, **Ohio Hoist Mfg. Co.**, Lisbon, Ohio. Prior to joining the company as general sales manager late in 1958, he was a member of the executive staff of Geo. A. Tinnerman Corp. **Reese Lewis,** vice president and general manager, has retired.

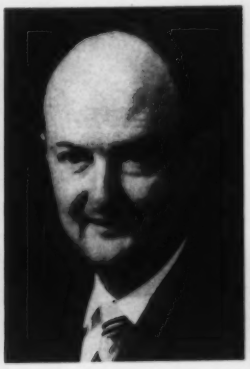


O. M. Bundy
Clark Controller prod. mgr.

ANTHONY J. MALISEK
Bridgeport Brass purchasing dir.

I. J. KARASSIK
Worthington-Harrison Div. post

DONNELL W. NEWMAN
Comstock Steel v. p.-operations



GLEN R. PITTMAN
Modernair eastern mgr.

EDWARD L. PULASKI
Allegheny works metallurgist

Comstock Steel Co., Phoenix, Ariz., elected **Donnell W. Newman** vice president-operations for its three subsidiaries, Comstock Steel of Phoenix Inc., Comstock Steel of Tucson Inc., and Comstock Steel of Sacramento Inc. He was manager of Chicago district sales for U. S. Steel Supply Div., U. S. Steel Corp.

Glen R. Pittman was appointed eastern operations manager for **Modernair Corp.**, San Leandro, Calif. He was sales manager, Hydraulic Power Div., Hydraulic Press Mfg. Co., a Koehriig Co. division. He has temporary headquarters in Mt. Gilead, Ohio.

G. W. Carlson was appointed general manager; **R. W. Maxwell,** assistant general manager of Continental Can Co.'s **Construction Engineering** Div., Chicago.

Edwin F. Shelley was elected president, **USI Robodyne Div.**, U. S. Industries Inc., New York. He continues as director of advanced programs for U. S. Industries.

Edward L. Pulaski was appointed chief works metallurgist at the West Leechburg Works of **Allegheny Ludlum Steel Corp.**, Pittsburgh. He was assistant chief metallurgist.

OBITUARIES...

Ralph S. Howe, 67, president, **New Britain Machine Co.**, New Britain, Conn., died Jan. 13.

Van Winkle Todd, 66, chairman, **Hanson-Van Winkle-Munning Co.**, Matawan, N. J., died Jan. 15.

Charles A. Holtz, 85, vice president, **Appleton Structural Steel Co.**, Appleton, Wis., died Jan. 11.

Elbert Powers, 33, manager of erection, **Bristol Steel & Iron Works Inc.**, Bristol, Va., died Jan. 13.

Joseph Custer, vice president and a founder, **Big Joe Mfg. Co.**, Wisconsin Dells, Wis., died Jan. 10.

Fred L. Pritchard, 61, Ohio district sales manager, Industrial Products Div., **Brown & Sharpe Mfg. Co.**, died in Cleveland Jan. 11.

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FOAMY METALS— Nickel, cast iron, and copper can be made into sheets or plates that resemble sponges, says General Electric Co., Cincinnati. The technique is useful in making high temperature seals for jet engines. It improves performance two ways: The engine is lighter and more efficient; and foamed metals permit tighter tolerances. Another proposed use: Foamed copper bus ducts (the insulating feature cuts down electrical losses as heat while current carrying ability is unaffected).

NEW MALLEABLE IRON COMING—Centra-Steel, an as-cast malleable iron under development at Central Foundry Div. of General Motors, could mean lower cost castings. Big advantage of the material is elimination of the long anneal required for malleable and pearlitic malleable iron. With only a low temperature anneal, it develops properties equal to Central Foundry's oil-quenched ArmaSteel (pearlitic malleable).

MORE ON MALLEABLE—Look for more malleable and pearlitic malleable iron castings in future cars and trucks. About 1000 cast connecting rods will go into GM cars this year and GM trucks soon will have cast crankshafts, says Central Foundry Div., General Motors. Although cast malleable parts show some advantages (strength, weight saving) over gray iron castings (and fabricated parts in some cases), insufficient cost savings constitute the biggest deterrent to a major shift in the auto field, particularly where captive gray iron foundries are involved.

APPLIANCE TREND— An ultrasonic dishwasher is the latest thing for your kitchen, says Westinghouse Electric Corp., Pittsburgh. The appliance uses 20,000 cycles per second to hasten cleansing in remote and difficult corners. Another goal: An ultrasonic clothes washer. There's only one drawback—high initial cost.

REDUCING EXPERIMENTAL TIME— Research people can get more done in a given time with a new statistical technique called polyvariable experimentation. It produces these results: Experiments cost less; you can investigate a problem more thoroughly than with classical methods; the idea is flexible; you can handle more parallel investigations on one subject. You can get a booklet on the technique by writing Dr. Franklin E. Satterthwaite, Statistical Engineering Institute, 8 Fuller Rd., Wellesley Hills, Mass.

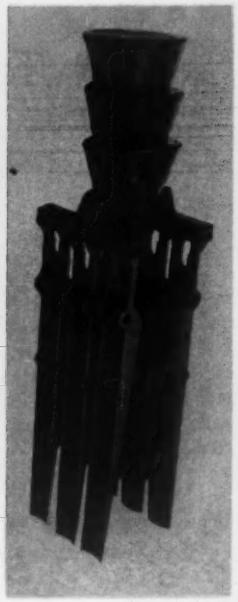
MILLING CUTTERS— Economy through interchangeability of milling cutter blade inserts is the object of a new American standard just approved by the American Standards Association. (The American Society of Mechanical Engineers published it.) It covers principal dimensions only and divides them into five general categories.

STAINLESS CONDENSER— Cooling steam to water at the Monongahela Power Co., West Virginia, wore out more than 9000 tubes every ten years because raw river water used to cool the condenser is slightly acid. Type 304 stainless tubes now in use are expected to last 30 years. Heat transfer is the same as that of the former material because the stainless wall is thinner, and corrosion materials don't build up to impede heat transfer, says Allegheny Ludlum Steel Corp., Pittsburgh.

LEAD BRAZING— Ceramics can be sealed tightly to metals with a lead base brazing compound, says Sylvania Electric Products Inc., New York. Composed of 90 per cent lead, 7 per cent copper, and 3 per cent titanium, the joint is fired at 1850° F in a hydrogen or an inert atmosphere. Breakdown temperature: 575° F. The technique is said to be superior to those employing silver or plastic seals.

PLASTIC OVERCOATS FOR METALS— To get them, you dip a heated metal part into a fluidized bed of plastic powder. The result is a hard, durable coating on a sturdy metal base. It's used for parts that must be strong yet resist abrasion without roughening the mating surface. Formerly available only from the Polymer Corp., Reading, Pa., the firm says it will license the process to anyone.

Molten metal is cast directly into the shell. No container or investment backup is needed to support the shell



A number of wax patterns are assembled on a wax sprue, ready for investing

Refractory Shells Aid Investment Casters

Advantages cited by the author include lower costs, more consistent quality, and the ability to cast larger parts. The process is being used commercially

By E. M. BROAD
Chief Engineer
Hitchiner Mfg. Co.
Milford, N. H.

A TECHNOLOGICAL breakthrough in precision casting is in the making. Shell type molds are the key. Laboratory, pilot, and a few production operations both here and abroad point the way to bigger and better investment castings.

Most of industry's optimism is based on the improved properties and versatility of the shell itself. As an added attraction, the castings will often be made on automatic or semiautomatic lines. Costs will be far below those associated with present techniques.

• **What It Is**—In conventional investment casting, wax replicas of the part to be cast are ganged on a wax runner or sprue. The sprue is placed in a steel flask (for ferrous casting, the sprue gets one or two coats of ceramic) and the investment material is poured in.

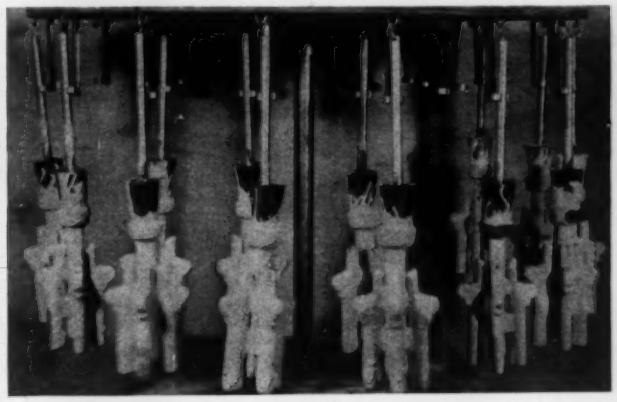
The shell approach replaces the steel flask and the cylinder of investment material with a relatively thin refractory coat over the entire sprue.

• **How It's Done**—Shell type processes start out like conventional methods. A precoat of one or more finely ground refractories in a suitable binder or liquid is applied to the wax sprue, and a coarse, dry refractory material is sprinkled on.

The refractory sets the coat and acts as a keying or locking medium to give support to the next layer. Unlike the conventional process, shell operations don't stop with a single or double layer. Six or more layers are applied; the coat is $\frac{1}{4}$ to $\frac{1}{2}$ in. thick. The resulting mold, after wax removal, is simply a shell of refractory material surrounding the cavity the metal is poured into.

For some large parts, it may be necessary to support the shell by backing it up with dry, loose sand or crushed refractory. With small parts, it is often possible to cast directly into the shell without any backup.

• **Parts To Consider**—Parts with fairly simple configurations have the biggest potential. Proper coating of deep recesses, small holes, thin slots, and undercuts requires special care and extra time. With such shapes, shell techniques will



In this series, a cluster of patterns is dipped in a liquid coating, stuccoed with a dry refractory, then hung to dry. The sequence is repeated until several layers have been applied, producing a shell thickness of ¼ to ½ in.

about equal conventional investment casting.

You probably can cast bigger parts with shell techniques than with the conventional. Reasons: The improved heat transfer properties of the shell over the solid mold, and the shell is less likely to crack.

Thicker sections are possible. Today, most casters think about 1 in. is the maximum. Tomorrow, it will be commonplace. Success with thicker sections will depend partly on the metallostatic head. A 3 in. section, for example, may be possible with a head of a few inches; it may not be possible with a head of, say, 12 in. The problem is one of shell distortion due to the combination of heat concentrated in the heavy section and the pressure exerted on it.

Minimum thickness should be in the order of present values. A 4130 steel part with 0.090 in. sections presented some filling difficulties in conventional practice. They were not encountered with shell molds.

Dimensional tolerances should be at least as good as those obtained with today's techniques. Some of the variations contributed by the ceramic investment itself, and by the mixing operations, may be reduced.

• **Costs**—At least part of the cost story depends on the nature of the ceramic material used. Some foundrymen will use expensive refractory material, and their thinking is geared along different avenues from those considering less costly refractories. The aim at Hitchiner is to use the least expensive materials, consistent with good surface finish and high speed production methods.

Small run jobs probably offer the fewest advantages, especially if the size of the casting is about the same as that of most present day lost wax parts. Increased labor costs of shell building may rule out such parts. But when the volume of one casting becomes large enough, automation or semiautomation of the shell-building operation can be adopted.

• **Automation** — Much wishful thinking has been expended in automating investment mold making. Some starts have been made, but almost always they go no farther than automatic weighing of materials, possibly automatic mixing, and, perhaps, a conveyor belt to lead the invested flask away from the hand filling station.

With shell type investment, automation—at least after the first coat, and perhaps even prior to it —doesn't appear to be too formidable.

Reports from Europe claim that such equipment is in operation. Small runs will not be possible on such equipment.

Costs will be incurred in special equipment to allow proper coating of the wax with refractory, to permit draining at the proper angle or angles, and to provide stuccoing at the right angle. Most parts will require individually tailored movements. Quantity production will be a necessary requirement. With quantity production, costs will be slashed by the elimination of hand labor in this expensive phase of shell investing.

Reductions in labor costs and the weight of refractories account for a good portion of the savings—especially if cheaper shell forming materials are used.

• **Short Runs**—Although large runs are conducive to large savings, short runs may be not only practical, but (in many cases) desirable. Hitchiner is making parts that because of size or anticipated ceramic difficulties would not have been made previously.

Costs for hogging large parts from solid or from roughed shapes are still extremely high, especially

The fully dip-coated sprue (at left) is ready for wax removal and casting. At right is the 8½ in. long finished casting. The thin wall was no problem in shell type investment casting

when smaller quantities are desired. In these cases, lost wax shell type casting can well be economical, even with a high tooling charge and a complete hand operated production procedure. Much will probably be done with the shell technique even when quantities are small if the part in question begins to tax the abilities of solid mold lost wax casting.

• **Further Savings**—Because of the elimination of the investment backup, ceramic problems seem to be fewer. In conventional lost wax investing, one source of continued trouble is the bond (or, more correctly, the lack of bond) between coat and backup material. A good portion of all investment casting defects attributed to ceramic causes is a direct result of lack of bond. With the elimination of a mechanically bonded backup, costs should again head downward.

Example: A conventionally made casting (quantity: 100,000 yearly) was priced at $16. In quoting the same casting on a projected semiautomatic line from patternmaking to gate removal, the price was $6, which is also considerably less than present forging and machining costs.

• **Overhead Costs**—Savings in overhead items also appear to be staggering. For example, the costs for flasks alone exceed $25,000 a year in many foundries. Elimination of the backup would save almost that amount. The use of less refractory per mold will reduce the capital expense in material handling equipment. Less refractory to heat up during the mold firing stages will increase the speed of this phase of the operation and will provide for the processing of more molds per furnace unit, thus also reducing capital expenditures.

Even though this sounds too good to be true, more plus factors must be cited. Most present ferrous investment foundries operate on a one to two week production cycle from waxing to casting. With the long run automatic or semiautomatic production, the manufacturing cycle can be cut in half. Hitchiner has produced castings one day after wax patterns were made—and they weren't small or selected samples. Sizes ranged up to 8 in. over-all, weights up to 2 lb for individual castings and 15 lb for full sprues.

• **Casting Properties** — When it comes to mechanical properties and reproducibility of results, Hitchiner's development engineers tread cautiously. They point out that properties are dependent to a great extent on the inherent grain size of the casting, that inherent grain size is dependent on the rate of solidification, and that metal poured into a shell type mold will solidify much faster than metal poured into a heavy, thick, monolithic, ceramic mold.

Unfortunately, not enough work on mechanical properties has been done to allow the statement of broad claims. But metallurgists feel an improvement in properties is likely; probably even more important, it's almost certain that results will be more consistent.

• **Consistency** — The solid mold technique requires great care to get consistent mechanical properties. The foundryman is restricted by economic considerations in the spruing of patterns. He must place the patterns as best he can within the confines of a metal flask. Final properties can vary considerably from piece to piece, depending on the amount of investment material between each piece and the outside of the flask.

With a shell, however, each pattern or casting is surrounded by a more nearly equal quantity of refractory. This also offers an added possibility toward both better reproducibility and higher values since the reduced thermal capacity of the shell will allow for better external control of solidification than has been possible.

What about rejection rates (using x-ray, Magnaflux, or Zyglo)? It must be stated that while optimism is also shown here, it is best defined as wishful thinking at this stage. Possibly, better gating and risering techniques in solid mold casting could also produce improvements in these areas; the improvements shown in some shell cast parts may have resulted from better foundry practice more than from the shell process itself.

• **Hurdles**—The shell itself is not a new concept in investment casting. Other processes have long made use of this type mold with great success using frozen mercury patterns. But the problems of adapting this technique to wax or plastic patterns have centered on the expansion of the pattern during the pattern elimination cycle. As the pattern material is heated, it expands (before it melts) faster than the surrounding refractory, cracking the shell.

Recent advances that account for the increased enthusiasm are: A stronger shell less subject to cracking, ingenious methods for removal of the wax that overcome expension problems, and more porous shells. Although not all the new techniques boast of improvement in all these areas, improvements in at least two of them appear to justify claims.

Both the stronger and more porous shells result from advances in either the chemistry of the shell building process or in newly developed materials.

• **Wax Removal** — Improved wax removal techniques involve: 1. Dissolving the wax with trichloroethylene vapor. 2. Flask firing. 3. Heating the mold in liquid to melt the layer of wax next to the refractory.

The solvent vapor from the trichloroethylene bath, heated to 248° F, permeates the porous shell and immediately dissolves the wax adjacent to it before the heat of the solvent vapor expands the wax. It is claimed that a 15 lb capacity mold can be completely dewaxed in 30 to 45 minutes.

In another technique, the molds are placed directly into the furnace at 1850 to 1900° F, and the wax immediately begins to melt and burn.

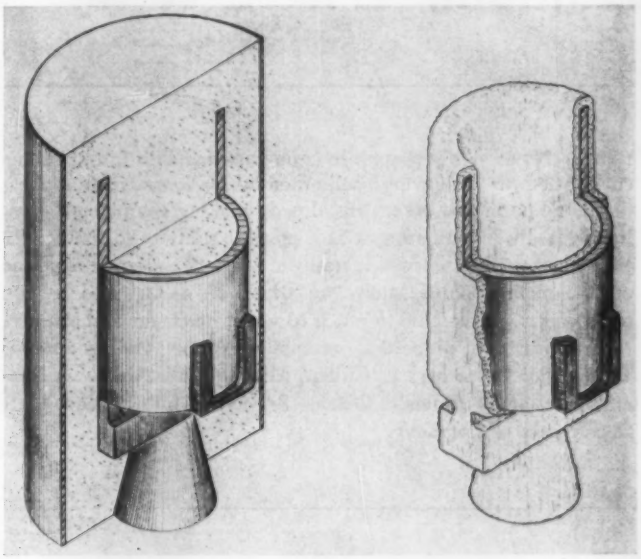
The shell, although not too porous, has excellent thermal shock resistance and easily withstands this drastic treatment.

• **Future** — Advances forecast for investment casting breed optimism among all those who have investigated the processes. Solid mold lost wax casting will not be replaced. Those continuing to produce castings by conventional methods will still have much to do. Those who change to shell type castings certainly will have their share of jobs, but their share is likely to be drawn from other fabricating processes.

Precision founding will become even more competitive with machining and forging, especially in parts that weigh more than a pound.

A technological breakthrough in precision founding certainly appears to be in progress.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.



The Change in Investment Casting

These sketches show the difference between conventional investment casting methods (at left) and the shell type mold.

Here are the advantages the author cites for the shell process:

1. Less investment material is used. The conventional method uses loose investment to fill the flask.
2. The strength of the shell makes it unnecessary to use the stainless steel flask for support during handling and pouring.
3. The thin, uniform coating of the shell provides relatively even, high thermal transfer—it means more easily reproducible, and possibly higher, mechanical properties.
4. Part size is not limited by flask size. Larger castings can be made. Some parts made this way weigh over 50 lb.
5. Part costs will be lower because: The new method is suited to automation techniques; less refractory is used; flasks are eliminated; scrap and rejects should be lower; and capital equipment costs may be less since there's a shorter processing time and you can get more molds per furnace.

Zirconium: Where It Is; Where It's Going

Editors' Note: While zirconium is now used chiefly in the atomic energy field, it is showing good potential for commercial applications. Some metalworkers are already making components from it; others are investigating it as a possible solution to their problem jobs. It may answer a need for you. To keep you posted on the metal's status, show you where it's going, and suggest ways you might be able to put it to work, here's an authoritative report on its uses, properties, workability, supply, and production. The author is Herbert L. Cullen, Miscellaneous Metals & Minerals Division, Business & Defense Services Administration, U. S. Department of Commerce.

Its Applications

THE MOST IMPORTANT use for zirconium is in atomic reactors. There are four structural metals—beryllium, magnesium, zirconium, and aluminum—with low neutron capture cross sections. Only zirconium combines that property with the strength, corrosion resistance, availability, and cost to make its use attractive. Its strongest competitor for reactor use is stainless steel, which competes pricewise despite a higher cross section.

• **Atomic Uses**—Reactor-grade (the hafnium is removed) zirconium is used principally to clad uranium fuel elements. It's also used as a core alloy with uranium. The largest requirement is for sheets and strip which are welded to form multiplate subassemblies for the fuel element. A recent trend is toward the use of tubing (welded or extruded) to enclose enough cylindrical pellets of fuel (uranium oxide) to make a fuel rod. Factors to be considered are the ease of servicing the reactor and replacing the fuel elements, and recovery and reprocessing of the fuel. The zirconium used in reactors is usually an alloy, Zircaloy-2, which contains 1.5 per cent tin and small quantities of iron, chromium, and nickel.

• **Civilian Uses**—Commercial grade (containing hafnium) zirconium is cheaper than the reactor grade. Its most promising application is in items like valves and tubing where corrosion is a problem. It must compete with tantalum, titanium, stainless steels, and the nickel alloys such as Monel.

Zirconium is replacing tantalum in bone screws, suture wire, and cranial plates. As an alloying element, it has a promising future in magnesium and titanium alloys. It has been used as a minor element in many other alloys. Added to steel in the form of zirconium-ferrosilicon, it acts as a grain refiner, deoxidizer, and scavenger of nonmetallic inclusions.

• **Marine Uses**—The use of zirconium alloys in the Naval reactor program is well established. Five atomic submarines are already in service: *Nautilus*, *Seawolf*, *Skate*, *Swordfish*, and *Skipjack*. Nineteen others are under construction and due to be commissioned by the end of 1960. At least nine more have been authorized. Also in the Navy program are an aircraft carrier, a cruiser, and a frigate—all with nuclear propulsion. The first merchant ship with an atomic powerplant, the *N. S. Savannah*, is also under construction. Its reactor was designed to use stainless steel for cladding the first fuel elements, but in view of the recent price reductions, zirconium could be used to clad replacement fuel elements. There are additional possibilities for the use of zirconium in future propulsion systems—in planes, trains, submarine tankers, and other merchant ships.

Production and Consumption

THE PRODUCTION and consumption of reactor grade zirconium sponge in 1958 was about 1100 short tons. (Consumption is difficult to estimate because of the inventory held by the Atomic Energy Commission.) It is expected that consumption will reach about 1750 short tons annually by 1962 and about 2100 short tons by 1965. It appears that the present industry capacity (2500 tons of sponge annually) is sufficient to meet expected requirements for several years.

Properties and Description

ZIRCONIUM is a silver-white metal which, in its pure form, is malleable and ductile. It has a specific gravity of 6.49 (vs. 4.5 for titanium and 7.7 for iron). Its melting point is 3366° F. Its resistance to the passage of heat and electricity is high. It's chemically inert at room temperature. Its resistance to corrosion by most chemicals is sufficient to permit it to compete in such applications as chemical plant equipment.

The most significant property of zirconium is the low thermal neutron capture cross section of the pure metal. That, plus its strength and resistance to high temperature water, makes it an excellent structural material for atomic reactors. But it must first be separated from its sister element, hafnium, because hafnium has a high thermal neutron capture cross section which would offset zirconium's low cross section.

Processing and Workability

LIKE TITANIUM, zirconium readily absorbs oxygen, nitrogen, and hydrogen at elevated temperatures. The consumable electrode melting method used for titanium was easily

Zirconium Scoreboard

	Sponge Producer	Ingot & Mill Products	Processor
Carborundum Metals Co.	X	X	
Columbia-National Corp.	X		
Mallory-Sharon Metals Corp.	X	X	
Wah Chang Corp.	X		
Allegheny Ludlum Steel Corp.		X	
Firth Sterling Inc.		X	
Harvey Machine Co.		X	
Oregon Metallurgical Corp.		X	
Westinghouse Electric Corp.		X	
Jessop Steel Co.		X	X
Simonds Steel & Saw Co.		X	X
Superior Steel Div., Copperweld Steel Co.			X
Heppenstall Co.			X
Superior Tube Co.			X
Chase Brass & Copper Co., division of Kennecott Copper Corp.			X
Bridgeport Brass Co.			X
Damascus Tube Co.			X
Trent Tube Co.			X
Bishop & Babcock Mfg. Co.			X
Wolverine Tube Div., Calumet & Hecla Inc.			X
Canton Machine & Drop Forge Co.			X
Titan Metals Co.			X
Babcock & Wilcox Co.			X

adapted for zirconium. Sponge metal is blended with alloying ingredients and compacted under high pressure into bars, which are welded together to form the consumable electrodes. Double melting is usually employed. The size of the second stage ingot is sufficiently large to permit forging and handling on regular steel plant rolling equipment.

Zirconium can be hot rolled, vacuum annealed, then cold rolled into strip on continuous mills. It is readily forged in the range of 1200 to 1600° F, and can be worked well by hammers or by press forging. It also is readily extrudable into rods or tubing with proper lubrication. But it's necessary to drill holes through billets before extruding, if tubing with close tolerances in wall thicknesses is required. Zirconium is easily drawn into wire, but proper die lubrication is essential to prevent seizing and galling.

Zirconium welds easier than titanium, but protection from oxidation is required—usually using helium or argon. It is similar to titanium in grinding and machining. It must be ground at slow speeds with grinding fluids to avoid smearing and burning the surface and to avoid the fire hazard of a heavy stream of sparks. It is easily machinable, but sharp tools and low operating speeds are essential because zirconium is soft but tough. Generous clearance angles on tool bits are recommended to minimize overheating and reduce fire hazards.

Supply and Ore Treatment

ZIRCONIUM OCCURS principally in zircon (zirconium silicate), which is found in quantity in Florida beach sand deposits and has been found in Oregon, Idaho, and California. Australia and India are also important producers.

The Florida sands—our principal source—are worked primarily for their titanium content. Present in the heavy sand (and presenting a new problem in separation) are rutile, ilmenite, lincoxene, zircon, garnet, and in some cases, monazite—the source of rare earth metals and thorium. Most zircon occurs with about 2 per cent hafnium oxide content, but deposits are known that contain more.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

Magnesium Alloy Welded Without Stress Relief

A new magnesium sheet and plate alloy, developed by Dow Chemical Co., Midland, Mich., doesn't require stress relief after welding.

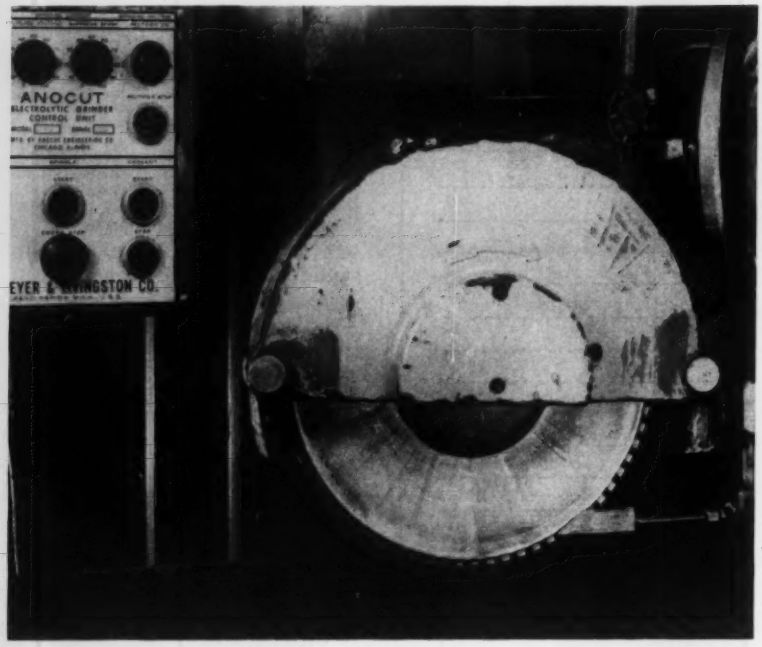
Called ZE10A, it contains zinc and rare earth metal as alloying constituents. It's tougher than any other magnesium sheet alloy now on the market, Dow claims. The company's Madison (Ill.) division is producing it commercially.

In the H24 temper (strain hardened, then partially annealed), ZE10A has a tensile strength of 38,000 psi; a tensile yield strength of 28,000 psi; and a compressive yield strength of 26,000 psi. It's available also in the −0 temper (fully annealed).

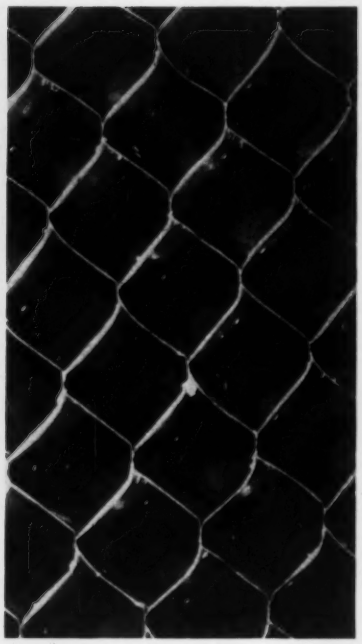
To take full advantage of the alloy's properties when welding it to magnesium extrusions, the user should choose extrusion alloys that don't require stress relief after welding, Dow points out. Typical extrusion alloys that can be used with ZE10A are the new alloy, ZK20A, and the older M1A.

Elimination of stress relief makes the alloy useful in large structures and in field repairs where it is difficult to apply stress relief, Dow maintains.

Missile shipping and storage containers, shipping containers for commercial bulk products, and tank-trailer bodies are listed as possible applications.



This serrated wheel is set up on a Gallmeyer & Livingston electrolytic surface grinder. Control unit and power supply are also used for conventional electrolytic machining



Stainless steel honeycomb shows slight surface imperfections, suggesting remelt of material during machining

Here's a New Method To Machine Honeycombs

ENGINEERS at Anocut Engineering Co., Chicago, have come up with an interrupted arc machining process for honeycombs. It is an ideal companion for the company's electrolytic machining method.

The conventional electrolytic grinding process uses an abrasive-bearing wheel to take off metal with a double attack, electric erosion and machining with abrasive.

It has one drawback: It is too slow for heavy metal removal jobs.

• **Partner** — The new interrupted arc process whips the problem of faster stock removal; it's being touted by Anocut spokesmen as the natural roughing method to go with finishing by electrolytic grinding.

Metal is removed by submitting it to a series of sparks or arcs of short duration. A metallic wheel with a number of serrations is used as the tool. Each groove is deep enough to assure the extinction of the arc passed between the wheel and the honeycomb foil.

The process works fastest, and turns out the best work, if the honeycomb core is immersed in an electrolyte—but it also works with water. The power supply is the same one used for true electrolytic machining.

• **Results**—On a stainless steel core of ¼ in. cell, made of 1½ mil foil, the process cut material to a depth of 0.060 in. at a rate of 30 ft a minute. Higher rates were achieved with shallower cuts.

The surface produced was flat and burrfree but showed some evidence of globular deposits, indicating remelting. Width of cut was 0.650 in.

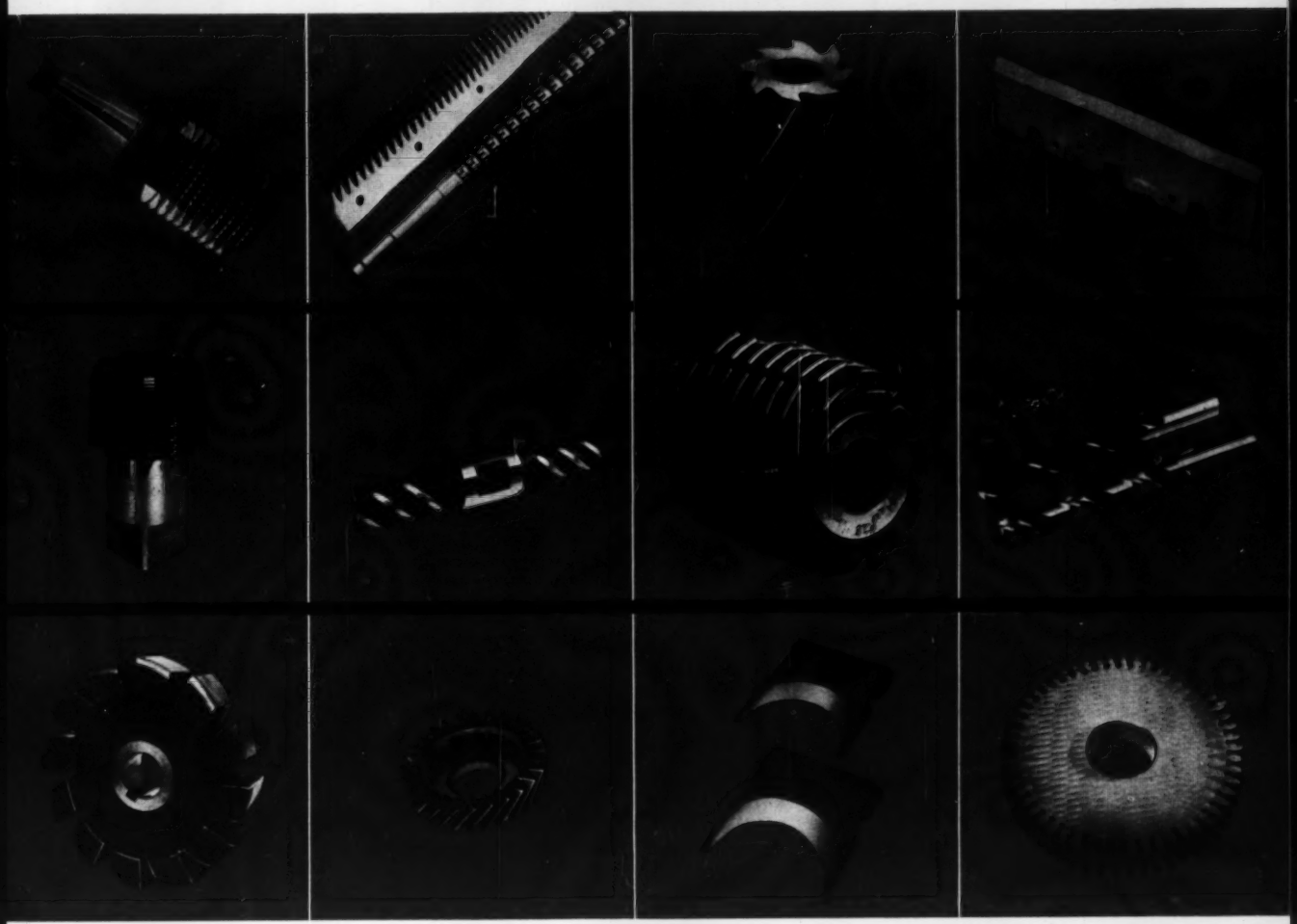
On aluminum honeycomb core, with 2 mil foil and ¼ in. cells, the same removal rate was obtained. Runs were also made at 10 ft a minute at a depth of ½ in.

• **Plusses and Minuses**—The interrupted-arc process is 12 to 30 times faster than conventional Anocut electrolytic machining. Its main limitation is that it produces some localized heating on the work—thermal damage may result, particularly on stainless steel cores.

So Anocut engineers suggest that interrupted arc be used for roughing, that electrolytic machining (it produces no thermal damage) be used for finishing.

If an electrolyte is used with the interrupted arc process, you merely change the wheel on the machine to make the switch to electrolytic machining.

used almost everywhere . . . for almost everything!



America's staple high speed steel

VASCO M-2

This is the basic, utility high speed steel favored by toolmakers and toolmaking departments of industries throughout the country. Versatile, dependable VASCO M-2 is always readily available in standard and special rolled shapes, hammer-finished bars, blocks, disc and ring forgings, plate, sheet, discs and rings punched from sheet, drill rod, tool bits. Ground finish is obtainable on all items when desired. VASCO M-2 is also furnished in free-machining (FM) grade. Large stocks are maintained in principal manufacturing centers.

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and many other FIRST QUALITY *high speed steels*
known and preferred throughout industry.

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LATROBE, PENNSYLVANIA

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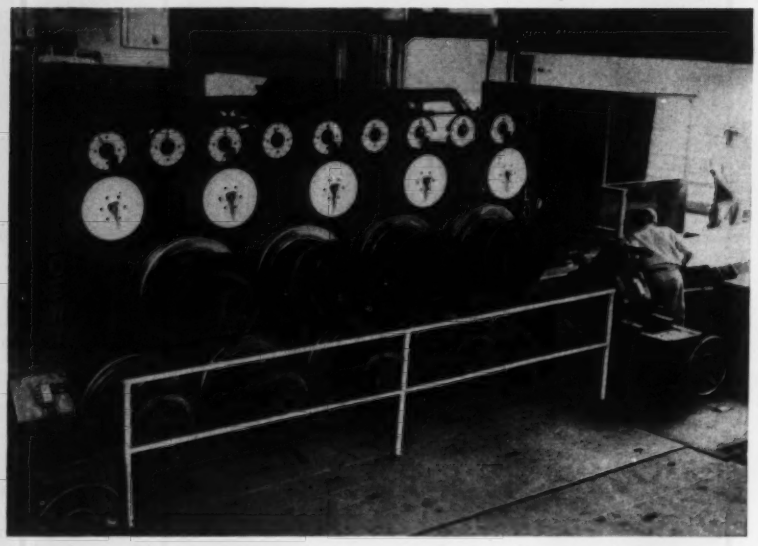


Structural steel from mill hot bed passes through rollers, emerges ready to ship. Dials indicate vertical and horizontal adjustment of rollers

Straightener Takes Kinks Out of Beam Production

Machine requiring little floor space does better, faster job than the four presses it replaced; operator needs no special skills, can be trained in a few months

PROBLEM: Find a faster way to straighten structural steel leaving the rolling mill, before it's stored or shipped.

Solution: Install straightening equipment that's designed to save time, floor space, and manpower.

A new type beam straightener, developed by Loewy-Hydropress Div., New York, Baldwin-Lima-Hamilton Corp., takes bends out of beams faster than the four gag presses it replaced, and has increased output at a large steel mill in eastern Pennsylvania.

Since installation a little more than three years ago, the machine has been in operation around the clock (20 eight hour shifts per week) with only routine inspection and lubrication. It has paid for itself several times by increasing output tonnage and decreasing manpower requirements.

Structural steel, traveling as fast as 600 ft a minute, is straightened in one pass. The machine handles beams from 4 to 21 in. high, weighing 8.5 to 68 lb per ft. Beams of any length could be straightened, but hot bed capacity limits length to 70 ft.

• **Bend While Cooling**—Beams are produced by rolling ingots of red hot steel back and forth between rollers; steel is elongated and formed in the right cross section.

Because they're formed hot, beams are often twisted or warped. After cooling to 250° F or less, they must be straightened mechanically.

• **New Machine Easy To Use**—The roller straightener has greater output capacity than the gag press, takes little floor space, and is virtually automatic in operation. The operator feeds beams into the machine and adjusts the speed at which they pass through, by remote control. He can be trained in a few months, and needs no outstanding skills or abilities.

The operating principle is simple: Nine large rollers, in two rows (four on top and five on bottom) straighten the beams horizontally. Vertical pinch rollers at the front of the machine help force beams into the straightening rollers.

As the beam passes between the first upper roller and the first two lower rollers, it takes on a new curvature that is nearly uniform. Curvature is then removed by gradually diminishing bends made as the beam passes through the other rollers.

While the beam is being straightened horizontally, lateral curvature is removed by adjusting rollers sideways, or staggering them. Vertical rollers at the back of the machine help eliminate lateral bends.

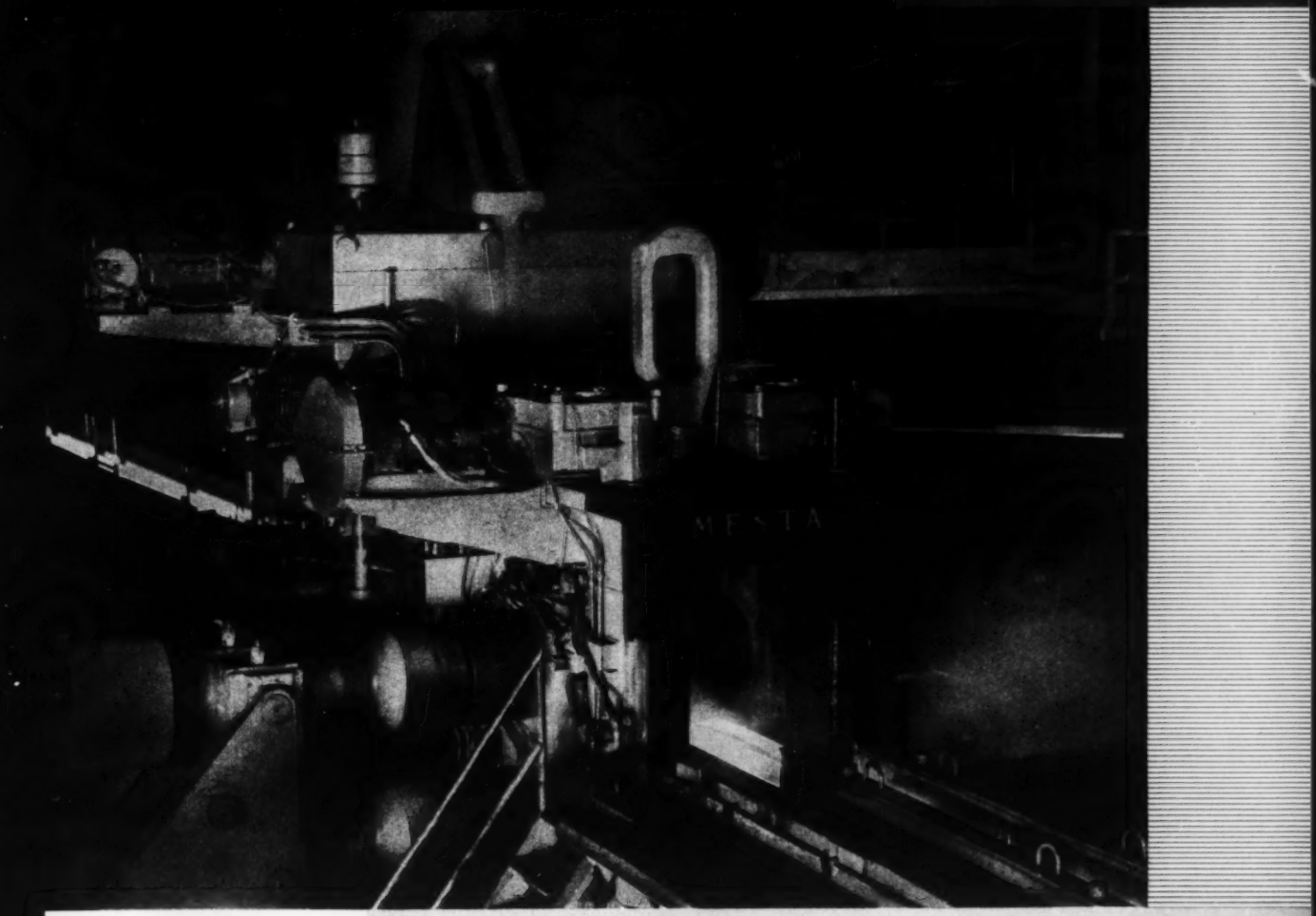
• **Gag Presses Limited**—Four gag press straighteners, each requiring a crew of four or five men, were used previously. In addition to the operator, three or four men were required to move beams to and from the straighteners, as well as to inspect, identify, and ship or store the beams.

Effectiveness of a gag press depends on the skill and judgment of the operator (it takes six to seven years to train a first class operator), and capacity of the presses is limited. Any increase in output requires a greater investment in presses, more manpower, and increased beam handling facilities.

When beams are straightened with a gag press, two vertical heads, supporting anvils, are moved back and forth on slides. One head oscillates, while the other is adjusted in and out by the operator. Heads straighten the beams by applying pressure to the bowed portions. The operator finds bends by sight, and determines the force to be applied. Even the most skilled operator does not always produce satisfactory results.

WIDE FLANGE BEAM AND STRUCTURAL MILLS

Designed and Built by MESTA



MESTA Universal Structural Mill rolling wide flange beams on the 44" Universal Stand and the 34" Edging Stand at Inland Steel Company, Indiana Harbor Works

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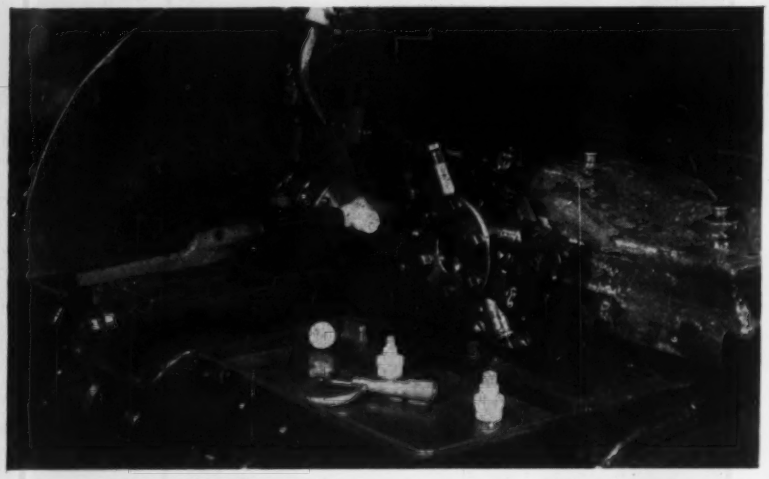


SPECIALLY TRAINED OPERATORS now machine "Teflon" to tolerances of .001" with Texaco Cleartex BX.

ANSWER TO "TEFLON" MACHINING PROBLEM FOUND BY THROWING OUT STANDARD CUTTING TECHNIQUES

DuPont's new thermoplastic, "Teflon" (or, more precisely, Polytetrafluoroethylene resin) has a combination of properties which makes it uniquely advantageous in a number of applications.

They also make it uniquely difficult to machine.

Unlike other thermoplastics, "Teflon" does not flow well in its melted state. This, plus the fact that the molding process requires extremely high temperatures, makes molding to close tolerances difficult. "Teflon" must be machined from rod stock when tolerance is a critical factor.

Special machining problems. Standard cutting techniques cannot be applied to "Teflon" machining, according to Mr. S. Mulay, President of Tri-Point Plastics, Inc., Albertson, N. Y. His firm, which specializes in working DuPont's new product, had to invent new cutting techniques and retrain operators to cope with "Teflon's" special characteristics. In spite of these steps, the materials—tools and lubricants—used in the machining process still gave Tri-Point trouble.

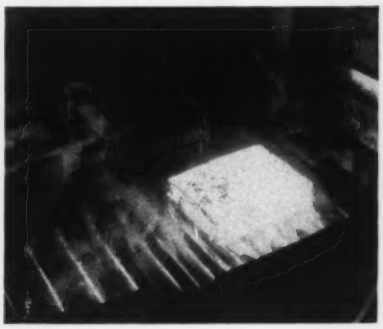
Cutting oil a critical factor. It soon became obvious that standard cutting oils used for ordinary metalworking were not adequate for "Teflon" machining. Although "Teflon" is not an abrasive material, its very low thermal conductivity coupled with its high heat resistance tended to shorten tool life by actually burning cutting edges. These high temperatures also warped the machined part, making close tolerances almost impossible. Finally, "Teflon's" white color made it extremely difficult to see the work through soluble oil emulsions—which otherwise might have solved the problem.

Tri-Point calls in Texaco. At this stage Tri-Point turned to the expert – a Texaco Lubrication Engineer. He outlined the need: a transparent cutting oil with the ability to remove the maximum amount of heat. After considerable study and testing, he recommended switching to Cleartex BX whose characteristics seemed precisely to fit the situation. His choice has proved to be right. Now Tri-Point uses this oil exclusively, with excellent results. Tool replacement has dropped significantly, and Tri-Point can count on maintaining "Teflon" tolerances of .001".

Pressure plus heat presents two-way lubrication problem

There is a definitely established trend today toward higher and higher temperatures in industrial processes in almost every type of industry. Mill rolls, plastic extruding machines and steam joints are only a few of the many applications which now involve temperatures well over 300° F. combined with high pressures. This combination has presented a severe lubrication problem – particularly in grease-lubricated equipment.

Nature of grease creates problem. As temperature rises, the consistency of grease decreases – most greases become virtually useless at temperatures above 350°. Furthermore, high heat will usually cause rapid oxidation and deterioration in a relatively short time.

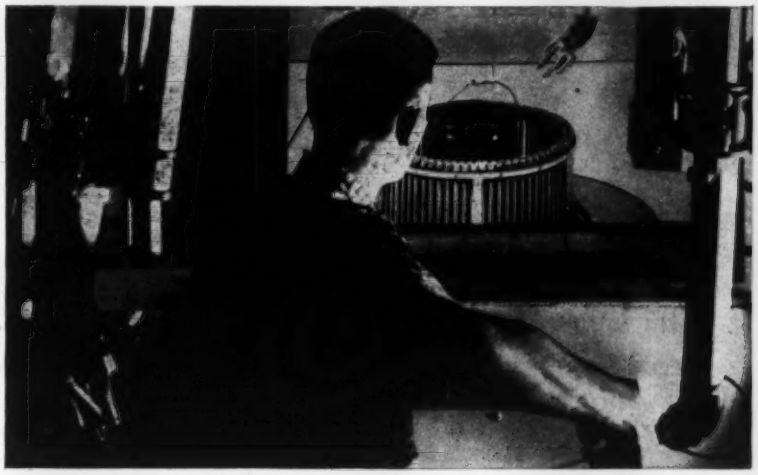


Unique new grease resists both forces. Texaco has now developed a new product whose remarkable performance in two years of field tests seems to answer the problems of *both* high heat *and* extreme pressure—Thermatex EP-1.

Thermatex is unique in its high resistance to both these forces.

Protects 400° equipment for two years. Thermatex has been field-tested for two years as the lubricant for steam joints in a paper mill. Previous products used had solidified and coked after two weeks of exposure to the extreme pressures and 400° F. heat, causing failure of the joint. Thermatex, on the other hand, has kept the steam joints operating without failures—and without significant wear—for two years.

news



GAMMA-RAY "HOT CELL" AT BEACON contains radioactive Cobalt-60.

Nuclear energy harnessed to crack the secret of better lubricants

Lubricants finer than the ones available from even the most advanced standard refining techniques will soon be produced by Texaco—with the help of nuclear radiation. Completely *new* lubricants are a real possibility, too – lubricants with atomic structures stronger and more cohesive than anything now available.

To open up this new frontier in lubrication, Texaco has assembled the most fully equipped nuclear laboratory in American industry. Texaco scientists have been put in command of all four basic irradiation forces—electrons, positive ions, gamma rays and neutrons—and are now probing the activity of hydrocarbon molecules during refining.

In addition to the Cobalt-60—rated at 29,000 curies – Texaco scientists have at their disposal a 6- to 10-million electron volt linear accelerator and a 3-million electron volt positive-ion Van de Graaff generator. The linear accelerator, or "electron gun," was especially designed and built for Texaco and is probably the only nuclear instrument of its kind now in use by a commercial firm for its own fundamental research.

Searching analysis of deposit problems

The January 1959 issue of *Lubrication Magazine* is entirely devoted to deposit problems—their causes, prevention and solutions. This article should be of vital concern to every engineer who has to cope with this often-costly lubrication problem. See coupon.

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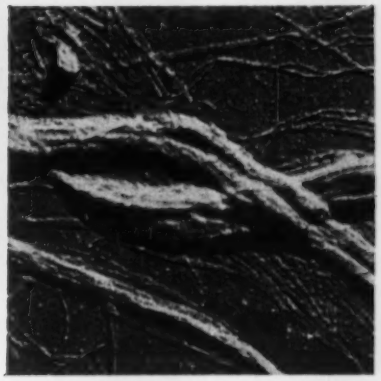
NEW PRODUCT NEWS

Nondrying protective coating keeps parts free from rust and corrosion for as long as a month during inter-process handling, storage, and shipment: *Texaco 564 Rustproof Oil.*

New, easy-to-apply gear lubricants won't drip in hot weather or flake off in cold – are ideal for many open-gear applications: *Texaco Geartac.*



How working splits grease fibers.

80,000x electron microscope explores grease structures

One of the most important tools of research, the electron microscope, is helping in the development of new and better greases. By understanding the nature of grease structures and their reaction to various conditions, Texaco scientists can create greases that are suitable for many different purposes.

THE TEXAS COMPANY, Dept. S-LN-10
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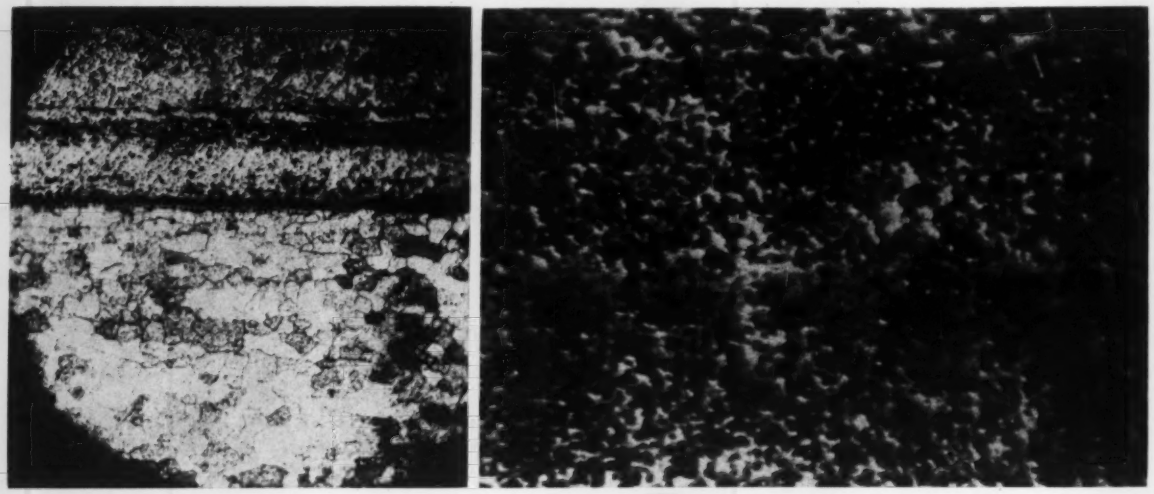


Left: Nickel-chromium, chromium carbide-nickel, and nickel-chromium coatings deposited on molybdenum; note diffusion zone between the body material and coating. Right: Tungsten carbide bonded with nickel

Process Makes Better Cermets at Lower Cost

Electrophoretic deposition is faster than other methods. Even on irregular shapes, it leaves a deposit that is uniform in composition and thickness

IF THERE'S a product in your line or any capital equipment in your plant that has to withstand extremely high temperatures, you'll want to consider cermets.

They can be made better now, and at lower cost, thanks to a new process developed by Vitro Corp. of America (New York).

Called electrophoretic deposition, the process features the deposition and bonding of refractory metal or ceramic coatings on a metal body, in graded layers.

The deposition rate is high, and current cost is low. Coatings are uniform in thickness and composition, even when applied on irregular shapes.

• **Uses Electrostatic Field**—An electrostatic field is established between two electrodes immersed in a suspension of charged particles. The particles migrate and adhere to one of the electrodes (in this case the material to be coated).

A mixture of metallic oxides or ceramic materials is deposited on the surface of a metal body, then reduced to metal by firing in a reducing atmosphere. The sintered metal matrix formed is bonded to the metal body.

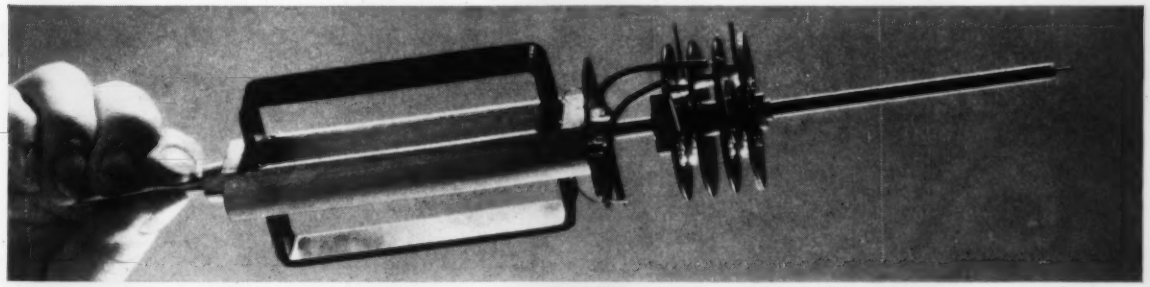
Ceramic materials are entrapped in the pores of the matrix, forming a cermet with the structural strength of metal and the oxidation resistance of ceramics at temperatures up to 1300 F. The external surface is metallic; a coating of ceramic materials can be added, then sintered, to produce a refractory surface.

The cermets are satisfactory for all but extreme temperature applications.

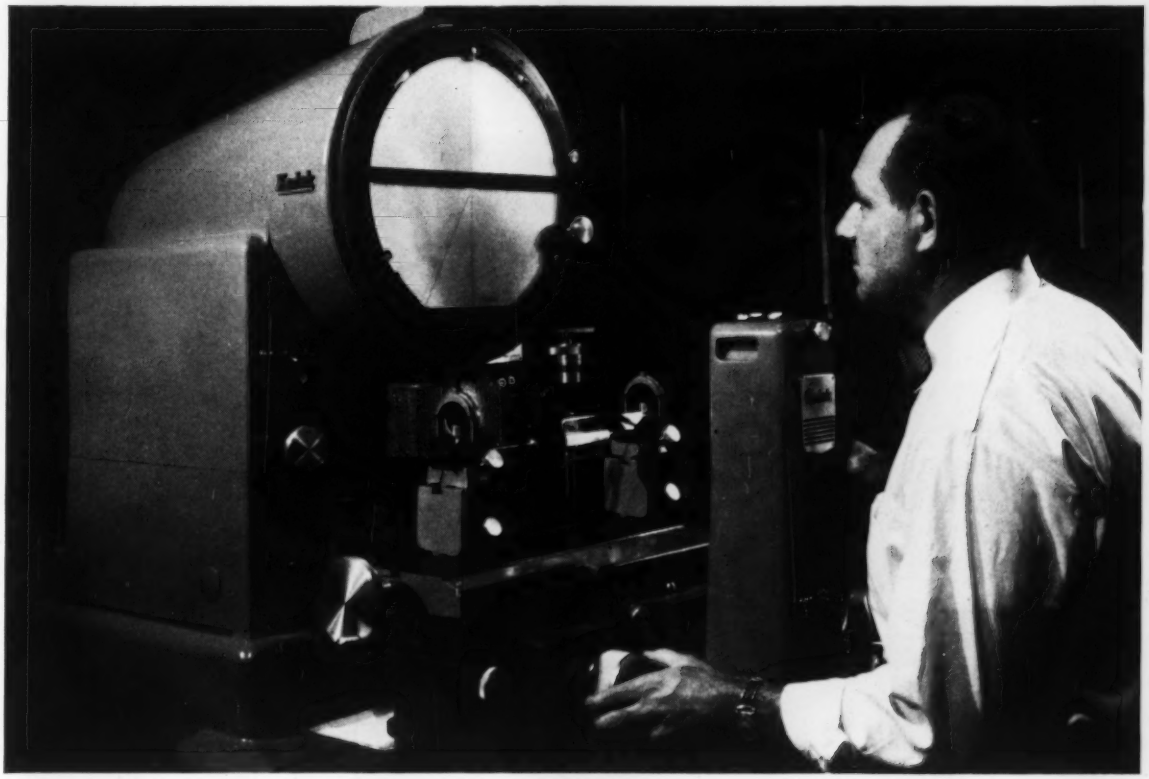
• **High Temperature Cermets**—To make cermets with stronger bonding and better resistance to high temperatures, metallic oxides are deposited on the metal base and reduced to metal at high temperatures. A second coating—a mixture of reducible metallic oxides and refractory ceramic materials—is applied and sintered. Finally, a ceramic coating is applied and sintered to produce a cermet with a refractory surface.

If desired, a metallic oxide can be deposited over the cermet and reduced to metal, sealing off pores in the surface and providing additional bonding action.

• **Choice of Materials**—The choice of metals and ceramics depends on intended use. Molybdenum, low alloy steels, and tungsten are most often used for bodies; reducible oxides of chromium, nickel, or cobalt are used to make metallic coatings. Carbides, borides, and silicides are used as refractory materials.



Before Westinghouse said "You can be SURE"...



they checked concentricity with this Kodak Contour Projector

What you see above is the moving element used in Westinghouse Type 44 electrical recording instruments.

Exact clearance between this element and the stationary elements is essential since these instruments often must be used in extreme temperature zones. This, along with the accumulation of tolerances in the complete assembly means that control of *concentricity* is vital.

You *could* check using surface plate, V-blocks, and height gage with clock indicator.

But Westinghouse checked concentricity with a Kodak Contour Projector. They saved time. They saved the cost of gages. They had *no* worries about damaging delicate parts because a beam of light exerts no pressure. And engineers were able to make corrections *before* production was started.

You, too, can be sure about effective, economical inspection with a Kodak Contour Projector.

The Model 14-5, shown in use at Westinghouse, is one of 6 models. They range from a portable, bench type model with 8-inch screen to the big 30-inch screen model.

Get all the facts. Write to:

Special Products Sales

EASTMAN KODAK COMPANY, Rochester 4, N. Y.

the KODAK CONTOUR PROJECTOR

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STOPS
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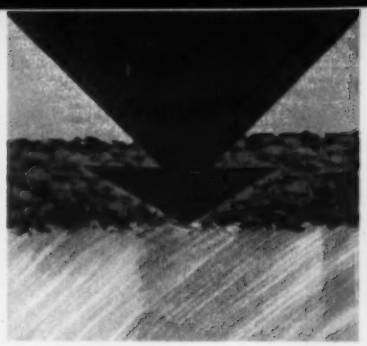
BEAUTIFIES AS IT

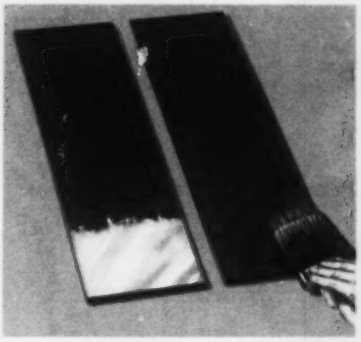
take brush!

Apply Rust-Oleum 769 Damp-Proof Red Primer directly over sound rusted surfaces. Saves costly surface preparations—lasts and lasts.



The **specially-processed** fish oil vehicle in the primer penetrates rust to bare metal—as proved in radioactive tracing studies.

Rust-Oleum, in its many forms, resists rain, fumes, heat, moisture, sun, and general weathering to stand up over the years.



Up to 30% more coverage with Rust-Oleum, depending upon the condition and porosity of the surface. Another Rust-Oleum difference.

See the many Rust-Oleum DIFFERENCES yourself!

Rust-Oleum primers and finish coatings are easily applied by spray. Flows smoothly . . . may be used in conventional, hot spray, or high pressure air-less spray.

A few easy strokes of the brush proves more than a thousand words . . . see how smoothly Rust-Oleum flows on . . . no pull, no drag . . . and it dries free of brushmarks. See, too, how much more coverage Rust-Oleum gives you . . . up to 30% more area depending upon the condition and porosity of the surface.

If your metal surfaces are *rusty*—simply brush or spray Rust-Oleum 769 Damp-Proof Red Primer right over the sound rusted metal after scraping and wirebrushing to remove rust scale and loose rust. The *specially-processed fish oil vehicle* in the primer penetrates rust to bare metal—driving out air and moisture. Easy as that to Stop Rust—and save time, money, and metal.

For *lasting beauty*—follow up with a Rust-Oleum finish coating in the color of your choice—from grays, greens, blacks, and aluminums to yellows, blues, whites, or browns—or from the many popular pastel shades.

That is the Rust-Oleum *System* of primer and finish coat for maximum over-the-years protection. A system that is measured by the money you save. Specify Rust-Oleum for maintenance, new construction, and re-modeling. Your Rust-Oleum Industrial Distributor maintains complete stocks for prompt delivery . . . he will be happy to consult with you on your coating problems.

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- ☐ Thirty-page report on Rust-Oleum fish oil penetration.

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¼			16-25
⅜	14-22		16-25
½	14-22		14-25
⅝	13-22		14-25
¾	13-22	13-16	12-25
⅞	13-22	13-16	12-25
1	11-22	11-16	11-25
1⅛	11-22	11-16	11-25
1¼	11-22	11-16	11-25
1⅜	11-22	11-16	10-23
1½	11-20	10-16	10-23
1⅝	11-20	8-16	10-23
1¾	11-20	8-16	10-23
1⅞	11-20	7-16	10-23
2	11-20	6-16	9-23
2⅛	11-20	6-16	9-22
2¼	11-20	5-16	9-22
2⅜	11-18	5-16	8-22
2½	11-18	4-16	8-22
2⅝	11-18	4-16	8-21
2¾	11-18	4-16	8-21
2⅞	11-18	4-16	8-20
3	11-18	4-16	8-20
3⅛	11-18	3-16	8-20
3¼	11-18	3-16	8-20
3⅜	11-18	3-16	8-20
3½	11-18	3-16	8-20
3⅝	11-18	3-16	8-20
3¾	11-18	3-16	8-20
3⅞	11-18	3-16	8-20
4	11-18	3-16	8-20
4⅛	11-16	3-16	8-18
4¼	11-16	3-16	8-16
4⅜	11-16	3-16	8-16
4½	11-16	3-16	8-20
4⅝	11-16	3-16	8-18
4¾	11-16	3-16	8-18
4⅞	11-16	3-16	8-18
5	11-16	3-16	8-18
5½	11-16	3-16	—
6	11-16	3-16	9-20

*Intermediate sizes, also larger and smaller sizes and heavier walls are available. Square, rectangular and other tubing shapes are also available in peripheries from 1" to 20" inc.

CARBON GRADES

Grade Designation	Carbon %	Manganese %	Phosphorus % Max.	Sulphur % Max.
MT 1010	0.05/0.15	0.30/0.60	0.040	0.050
MT 1015	0.10/0.20	0.30/0.60	0.040	0.050
MT X1015	0.10/0.20	0.60/0.90	0.040	0.050
MT 1020	0.15/0.25	0.30/0.60	0.040	0.050
MT X1020	0.15/0.25	0.70/1.00	0.040	0.050

HIGHER CARBON AND ALLOYS

Grade Designation	Carbon %	Manganese %	Phosphorus % Max.	Sulphur % Max.
C 1025	0.21/0.28	0.30/0.60	0.040	0.050
C 1026	0.21/0.28	0.60/0.90	0.040	0.050
C 1030	0.27/0.35	0.60/0.90	0.040	0.050
C 1035	0.31/0.39	0.60/0.90	0.040	0.050
4130	0.28/0.33	0.40/0.60	0.040	0.040
8630	0.28/0.33	0.70/0.90	0.040	0.040

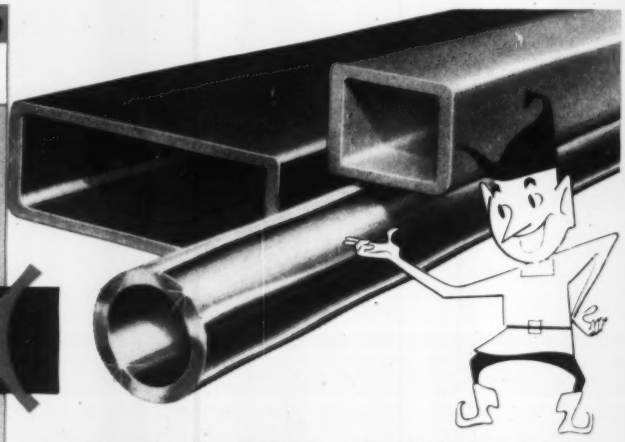
Grade Designation	Silicon %	Nickel %	Chromium %	Molybdenum %
C 1025	....	....	....	....
C 1026	....	....	....	....
C 1030	....	....	....	....
C 1035	....	....	....	....
4130	0.20/0.35	....	0.80/1.10	0.15/0.25
8630	0.20/0.35	0.40/0.70	0.40/0.60	0.15/0.25

STAINLESS GRADES

Type No.	Carbon (*)	Chromium	Nickel	Other Elements
302	.15	17-19	8-10	....
304	.08	18-20	8-12	....
304L	.03	18-20	8-12	....
309	.20	22-24	12-15	....
309S	.08	22-24	12-15	....
309SCB	.08	22-24	12-15	cb10XC Minimum—1 Maximum
310	.25	24-26	19-22	....
310S	.08	24-26	19-22	....
316	.08	16-18	10-14	Mo. 2-3
316L	.03	16-18	10-14	Mo. 2-3
317	.08	18-20	11-15	Mo. 3-4
321	.08	17-19	9-12	Ti 5 X C Minimum
329	.20	23-28	2½-5	Mo. 1-2
330	.15	14-16	33-36	....
347	.08	17-19	9-13	Cb-Ta 10 X C Minimum
348	.08	17-19	9-13	CB-Ta 10 X C Minimum Ta .10 Maximum
430	.12	14-18	....	....
442	.20	18-23	....	....
443	.20	18-23	....	Cu .9-1.25

(*) Maximum—unless otherwise indicated.

LC-592



WELDED TUBING

offers

- **THE SIZE**
- **THE GRADE**
- **THE SHAPE**

For a versatile tubular product, nothing equals Welded Steel Tubing. The quality producers offer a broad range of sizes and wall thicknesses in all weldable grades of carbon, stainless steel and other alloys. It is particularly adapted to shapes ranging from round, square and rectangular to the most complex special cross sections.

Welded Steel Tubing—as manufactured by the quality tube producers—offers a concise answer to most design problems. Specify Welded Tubing on your next order.

FORMED STEEL TUBE INSTITUTE, INC.

850 HANNA BUILDING

CLEVELAND 15, OHIO

• Armco Steel Corp. • The Babcock & Wilcox Co., Tubular Products Div. • The Carpenter Steel Co., Alloy Tube Div. • Clayton Mark & Co. • Damascus Tube Co. • Jones & Laughlin Steel Corp., Electricweld Tube Div. • National Tube Div., United States Steel Corp. • Ohio Seamless Tube Div. of Copperweld Steel Co. • Republic Steel Corp., Steel and Tubes Div. • Revere Copper and Brass Inc., Rome Manufacturing Company Div. • Sawhill Tubular Products, Inc. • Southeastern Metals Co. • The Standard Tube Co. • Standard Tube and T. I. Ltd., (Canada) • Superior Tube Co. • Trent Tube Co., Subs. Crucible Steel Co. of America

Joseph F. Nachman (left) and Leonard E. Olds of the University of Denver's Metallurgy Division (Denver Research Institute) developed the technique of mixing ceramics and metals

Ceramic-Metal Process Quadruples Hot Strength

New technique weds ceramics and nonferrous metals. Alloys retain working strength up to 90 per cent of melting temperature. Technique is termed "promising" for ferrous metals

A NEW technique called melt saturation mixes ceramic materials with metals to form high temperature alloys that are three to four times as strong as their conventional counterparts.

Its developers, Joseph F. Nachman and Leonard E. Olds, Metallurgy Division, Denver Research Institute, University of Denver, told STEEL the process imparts such increases in strength to copper at 1800° F and aluminum at 1000° F.

Says Mr. Nachman:

"Limited experience indicates the process should work as well with ferrous metals as it does on nonferrous."

Cost: A little higher than conventional casting but comparable to that of powder metallurgy.

• **High School Chemistry**—In developing the technique, Messrs. Nachman and Olds borrowed a page from a chemistry textbook: Mixing a solution of silver and one of chlorine immediately precipitates silver chloride. They reasoned that the same idea would work with molten solutions.

In practice, molten copper is put into two ladles. Thorium is dissolved in one and boron in the other. The two solutions are poured into a mixing chamber and from there directly into a mold. The cast is chilled fast before the thorium boride (formed when the two solutions are mixed) can settle out. The same results are obtained with aluminum, using thorium and silicon.

• **Balance Important** — The right percentages of alloying additions are important to prevent loss of electrical or thermal conductivity, Mr. Nachman emphasizes. Cooling rate is important — solidification should be as rapid as possible.

An early failure led to an important discovery: You can get the ceramic particles in the melt too fine to provide effective strength.

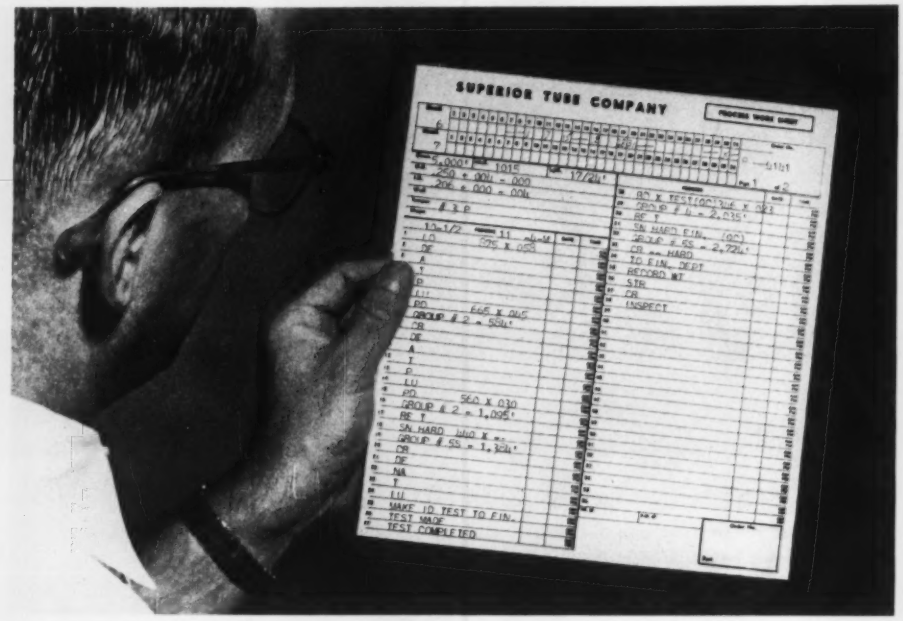
• **Implications**—Conventional metals generally lose their working strength at around 40 per cent of their absolute melting temperature. Ceramic-metal alloys retain theirs up to 85 to 90 per cent of the melting temperature, says Mr. Nachman. That will mean far better high temperature operation for a much wider group of metals than we know today.

Previous alloying techniques permitted the ceramic particles to form into lumps which gave only partly satisfactory results. Two methods have been practiced: 1. The compound melt method which requires adding finely divided ceramic particles to a melt. 2. Mixing ceramics with powdered metal, pressing, and sintering.

The research was originally sponsored by the Air Force. The University of Denver was the subcontractor for the copperwork.

Loading Is Controlled

Process work sheet details the amount, size, and type of material to be processed, steps required, and time each step should be done. Work sheet improved order shipping 20 per cent



Here's a Way To Speed Deliveries

It's a production control system that provides fast flow of machine loading and unloading data. It can be made even faster with automatic data processing equipment

SCIENTIFIC loading of production machines can improve delivery schedules, reduce raw material inventories, and cut overtime in large or small plants.

Put into practice at Superior Tube Co., Collegeville, Pa., it increased the number of orders filled and shipped on time by 35 per cent.

On the average, 84 per cent of the orders are now shipped within two days of the date promised. (It's industry practice to consider an order shipped on time if it is sent within one week of the promised date.)

• **Makes Small Tubing**—The company produces small diameter tubing and cathodes for electronic tubes. It uses tube hollows and metal strip for raw material. Much of the company's production is by cold drawing on machines called drawbenches. Because each drawing job is a custom operation, the work is handled on a per job basis.

The task of planning production and pinpointing delivery several weeks in advance is complicated by these factors:

1. About 1000 orders are usually in process at any one time.

2. More than 120 different alloys are offered as basic materials.

3. Tube sizes range from 0.010 to 0.625 in. in diameter. In some thin-wall tubing, diameters up to 2½ in. are processed in the plant.

4. Multiple operations carried out on a variety of machines are required to fill every order, and operations must be in a predetermined sequence.

5. Many orders require special heat treating and surface finishes.

• **Use New Work Sheet**—In setting up its production control system, Superior first introduced a process work sheet and installed an independent telephone system for in-plant communications.

The process work sheet serves three purposes:

1. Processing procedure is set down in complete detail by the production control department. Reason: To assure that the methods set up by the production department will be followed in the mill.

2. The date on which each op-

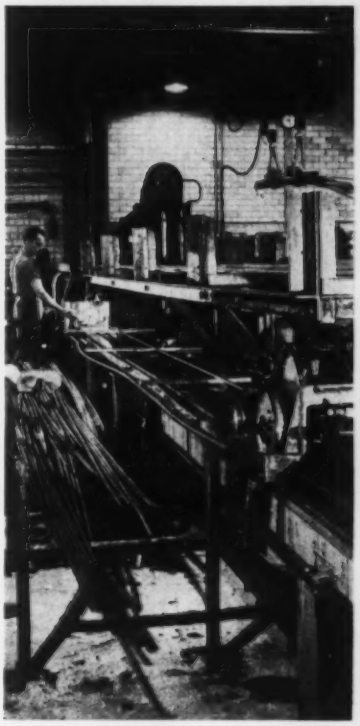
Continuing Record of Load on Mill

Group No.	Footage Written for Mill	Orders Processed Ahead of Schedule No.	Orders Processed Ahead of Schedule Footage	Footage Balance	Days Work in Mill
1	42,284	1	36	42,248	8
2	265,681	7	15,715	249,966	7½
3	117,018	26	20,103	96,915	3½
4	375,005	10	7,077	367,928	5

Forecast of Load on Mill for One Week

Group No.	Machine No.	Shifts 1st	Shifts 2nd	Shifts 3rd	Total Bench Shifts Operating	Total Bench Shifts per 5 Day Week	Total Bench Shifts Loaded for Week 1/30 to 2/5, Including Backlog
1	1109	*			1	5	3
2	283	*	*		3	15	13
	1374	*					
3	580	*	*	*	4	20	9
	1375	*					
4	191	*	*	*	6	30	18½
	274	*	*	*			

Top chart tells work written for mill, orders processed ahead of schedule, work remaining, and days of work in process. Lower chart is a forecast of total load on mill for one week. Drawbenches are grouped by size (only four of the six groups are shown here)



One of the drawbenches at Superior Tube Co. Scientific loading assures top production from each machine

eration is to be done is recorded. That guides the department in scheduling jobs on its production units.

3. The sheet travels with the job through all operations, so each operator knows exactly what to do.

• **Speeds Data Flow**—The central control station and switchboard for the telephone system are in the mill office.

Each of the eight mill departments and the production control office has a station.

The central station is manned 24 hours a day. Each station in the mill is attended by a man who is the production planner and dispatcher.

Each job received in a department is reported to the control station, with order number, size, and type of material. The information is recorded on a copy of the order kept in the mill office. That way, the current status of the order is always available.

• **Bench Loading Started** — Final step in the production control system is the bench loading concept. To set it up you must determine: 1. Hourly capacity (in feet) for each drawbench for each type of material the machine processes. 2. Number of hours for which each bench is currently committed, or loaded.

In practice, Superior finds it more convenient to work with larger units. It uses bench shifts (the number of feet the bench can process in one 8-hour shift) as the basic production unit.

• **Capacity Determined** — The capacity of each bench at the Collegeville plant was estimated by referring to cost accounting records which show the average amount of work turned out by each bench.

Benches of similar size are grouped (on paper) into production units called bench groups, and the capacity of each group determined in terms of bench shifts. Finally, the total amount of work that can be done by each group in a given period—generally a five-day week of three shifts a day—is tabulated.

The scheduling of work using the new system depends on keeping bench-loading information up-to-date. Loading charts kept in the production control office show the load on each group for each production period. Incoming work is assigned accordingly.

• **Bench Unloading**—An important part of the new system is an operation referred to at Superior as bench unloading.

Data for that operation are obtained from the bench operators who fill out time reports showing the number, size, and footage drawn on each order they process. The operators turn their time reports over to the dispatchers who telephone the information to the production control office.

The information is recorded on the bench loading charts. This part of the system tells production control about production capacity as soon as it becomes available.

• **Permits Accurate Forecasting** — The production control office is manned by a staff of seven. Production methods, scheduling of work, and delivery dates are all determined in that office.

With scientific bench loading, an accurate forecast on delivery can

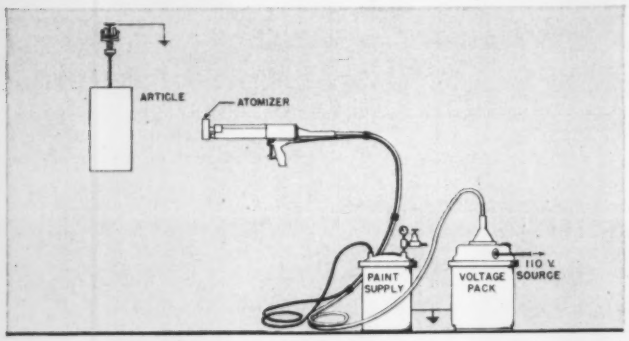
Here it is—

The PAINTING TOOL ALL Industry has been waiting for!

The NEW

RANSBURG

NO. 2 PROCESS ELECTROSTATIC HAND GUN



CUTS PAINTING COSTS!

Saves Paint because there's no waste. Now, for the first time, the high efficiency of Ransburg's No. 2 Process automatic equipment is available to you in the NEW Electrostatic Hand Gun.

Saves Labor, Increases Production because it is faster on many types of articles such as those fabricated from perforated and expanded metals, tubing, rod and wire. This is due to the "wrap-around" nature of electro-spray which paints ALL sides of such articles from one side only.

Saves in Equipment because no conventional spray booth is required—no water-wash, no sludge recovery! Uses no compressed air for atomization.

Saves Building Heat Loss because only mild ventilation for removal of solvent vapors is necessary, and . . .

Maintenance Costs Are Cut because clean-up and maintenance labor is only a fraction of that required by other, less efficient painting methods.

See how YOU can save in your own finishing department, and at the same time, improve the quality of the work. Write for literature and information showing how the Electrostatic Hand Gun has been proven on different products in a variety of industrial plants.

Call or write

RANSBURG

Electro-Coating Corp.

Box-23122, Indianapolis 23, Indiana

be made quickly after an order is received.

In addition to providing a moment-by-moment view of the work load in the plant, the system also indicates how work can be shifted among production units to help meet delivery schedules and take care of rush orders.

• **Adaptable to Growth**—At present, all records are posted by hand and reports of work in progress are dispatched to the central production control office by telephone. In the future, work demands and the number of production units may increase so that even the present system will be too cumbersome to yield the required information as quickly as it is needed.

For that reason, the system was planned to permit the installation of punched cards and automatic data processing equipment without altering production methods or retraining production and control personnel.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.*

Hard Coat Prolongs Life of Potentiometers

Potentiometers in electronic instruments have the prospect of longer life. Reason: Potentiometer mandrels made of aluminum now can be hard coated by a new process.

Developed by the Anachrome Corp., South Gate, Calif., an affiliate company of Anadite Inc., the Hardas process offers a coating with good dielectric strength and thermal conductance, high electrical resistance, and fine surface finish. It's said to be the only hard coating that can be applied to all aluminum alloys.

Anachrome developed the method while investigating ways to improve dielectric strength and heat conductance of chassis used for transistorized circuits.

Dielectric tests at 500 volts indicate electrical resistance many times greater than necessary. Heat conductance, which has been a problem with mandrels, is more than adequate.

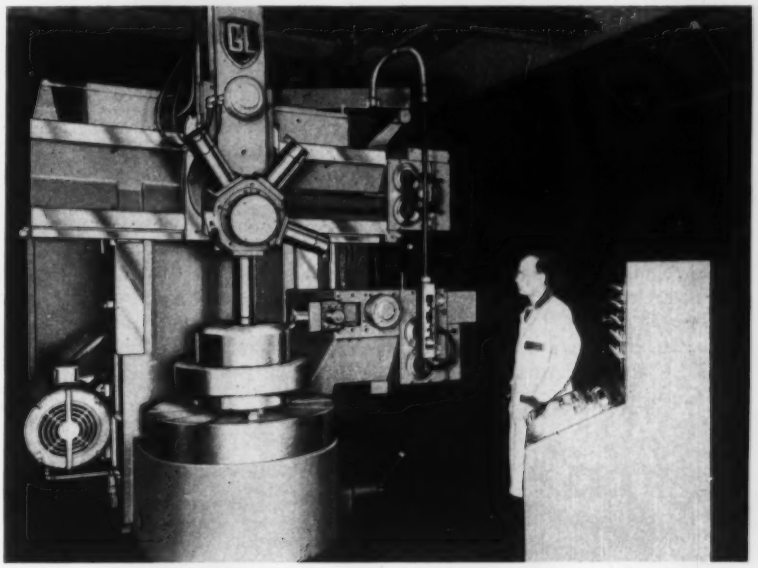
Tape Control Speeds Vertical Lathe Operation

USERS of vertical turret lathes now can get all the benefits of numerical control: Quick setups, fast operation between cuts, high cutting speeds, and consistent quality of finished parts.

A discrete tape positioning system controls feeds, speeds, turret indexing, automatic dwell, and coolant supply, as well as all auxiliary functions.

In programming, movements of the heads and table can be coordinated to minimize cycle time and avoid mechanical interference. Head and ram motions can be programmed for simultaneous feed to permit moving tools at 45 degrees. A standard eight-channel Flexowriter typewriter is required to prepare a tape from the programmer's worksheet.

An innovation which makes the system practical for general shop use is the override feature. With that control, the operator can add his information to the system in fine adjustments to height or radius. Once such adjustments are made, they become part of the program.



During long production runs, the override adjustment control compensates for tool wear.

The line of vertical turret lathes is available in 32, 42, and 52 in. diameter table sizes. Because of compact design, the machines require one-third less floor space than units of equivalent capacity.

For more information, *write* Kaukauna Div., Giddings & Lewis Machine Tool Co., Kaukauna, Wis.

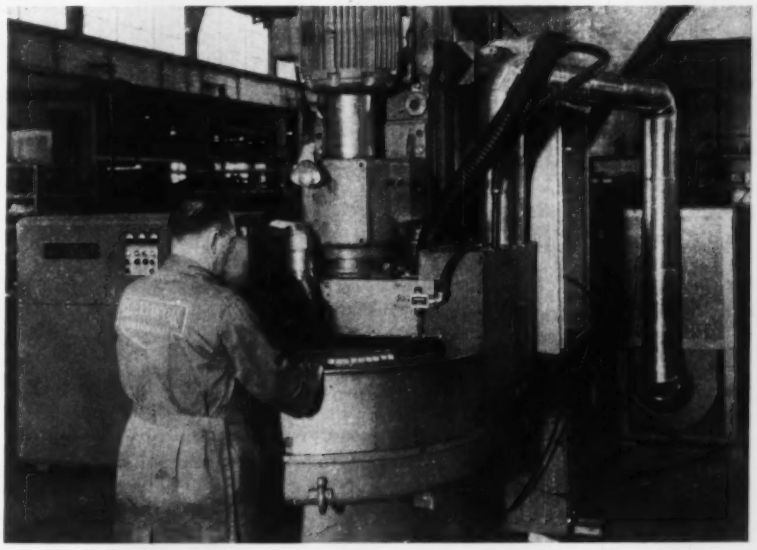
Electrolytic Tool Grinder Has High Output

BRAZED carbide tools can be ground in high production with minimum wheel wear in this vertical-spindle grinder.

It uses a 1500 ampere Anocut unit to supply the current required for the electrolytic grinding process. Because there is no contact between wheel and workpiece, wheel wear is reduced as much as 90 per cent over conventional methods.

Surface finishes up to 6 microinches are obtained while taking off up to 0.012 in. of tungsten carbide in a single pass.

To permit maximum efficiency in loading and unloading the work, the rotary table has wedge-shaped magnetic sections which are energized individually just before the workpieces go under the diamond wheel and de-energized immediately after



pieces leave the wheel.

The worktable has a speed range of 1.7 to 12 rph. For more information, *write* Mattison Machine Works, 545 Blackhawk Park Ave., Rockford, Ill.

Kit Eases PVC Repairing

YOUR maintenance man can make most necessary repairs on polyvinyl linings of acid tanks with a kit of tools offered by Perma-Line Rubber Products Corp.

The tools can also be used to make repairs on plastisol coated plating racks and plastic ductwork.

Selling for $159, the kit consists of a spark tester, a heat resistant stainless steel Perma-gun, dual seamer, stitcher, utility knife, and supplies of cement, patching material, and seaming material.

For more information, *write* Perma-Line Rubber Products Corp., 1753 N. Winnebago Ave., Chicago 47, Ill.

Composite Metal Offers Good Corrosion Resistance

POSSESSING all the qualities of clad metal strip, Thermo-Lay is especially useful when good corrosion resistance or electrical properties are required.

It is a hard, dense layer of metal electrolytically deposited on a base metal, then heat treated to achieve a metallurgical bond, and rolled to finished thickness and temper.

The material can be stamped, drawn, or formed as readily as any clad metal. It can be soldered, brazed, or welded.

Overlay metals for Thermo-Lay include silver, nickel, copper, tin, zinc, gold, cadmium, and solder combinations. They can be bonded to copper, brass, nickel, cupronickel, steel, and bronze.

For more information, *write* American Silver Co., 36-07 Prince St., Flushing 54, N. Y.

Weighing Attachment for Lift Trucks Speeds Flow

FREQUENT pickups and setdowns, necessary when floor scales are used, can be eliminated with a 5000 lb weighing attachment that fits Clarklift trucks.

The accuracy of the device (0.2 per cent) makes it practical for checkweighing receivables, weighing intraplant shipments, inventory control by weight, batch process weighing, and checkweighing freight shipments.

Weight of the load is applied to a steel column in a load cell. The compression is sensed by a strain gage and translated into pound readings on the instrument panel. A zeroing-out control permits the operator to discount weight of pallets or containers.

For more information, *write* Industrial Truck Div., Clark Equipment Co., Battle Creek, Mich.

Wheels Are Accurate

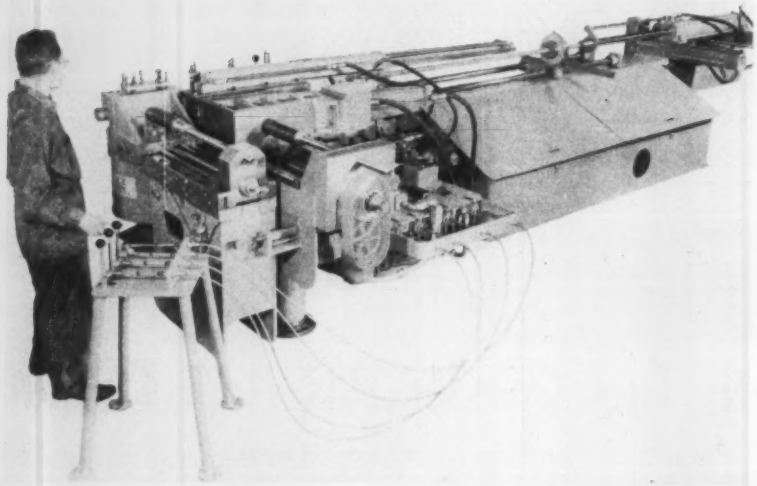
DIATRONIC diamond cutoff wheels cut fully hardened steels, silicon and germanium crystals, glass tubing, and tungsten carbide.

They have great accuracy: 0.006 x 3 in. wheels have rim tolerances of +0.0005 in., −0.0 in. *Write*: Navan Products Inc., International Airport, Los Angeles 45, Calif. *Phone*: Oregon 8-5615

Filters Are Self-Cleaning

A LINE of continuously operating filters can bring important savings by eliminating machine downtime and labor for filter cleanout.

Useful for cleaning cutting oils, coolants, and lubricants, the filters rejuvenate themselves by backwashing. Then they are automatically



Bender Handles Thin-Wall Tubes

THIN-WALL stainless and aluminum tubing can be bent 180 degrees by this machine.

The bending is done hydraulically which allows operator to control the operation from a wide area.

Measuring devices are not needed to set up the machine. Micrometer positioning dials for the pressure die, clamping die, and shoe are built in. Degree of bend is selected from a dial. Length gages are set from a scale mounted on the machine. A protractor is built in for rotation of planes between bends.

There is an 8 station degree-of-bend selector for a series of bends on a single tube. By having the bends needed on a process card, the operator can set up and duplicate any workpiece.

The bender can handle stainless tubes with a 5 in. OD and 0.085 walls or aluminum tube to 6 in. OD with a 0.065 wall. For more information, *write* Wallace Supplies Mfg. Co., 1304 Diversey Parkway, Chicago 14, Ill.

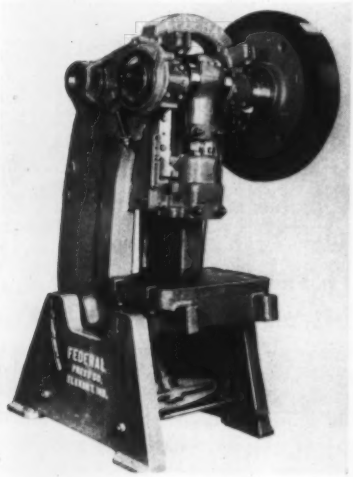
precoated. Backwashing and precoating can be regulated at preselected intervals from 30 minutes to 24 hours (set by timer), or automatically on demand determined by back pressure in the filter.

Filtration is accomplished by permanent tubular elements of Monel. Eight models in the filter line range in capacity from 600 to 10,000 gallons an hour.

For more information, *write* Olson Filtration Engineers, a division of American Laundry Machinery Co., 5024 Section Ave., Cincinnati 12, Ohio.

Press Frame Is Cast Iron

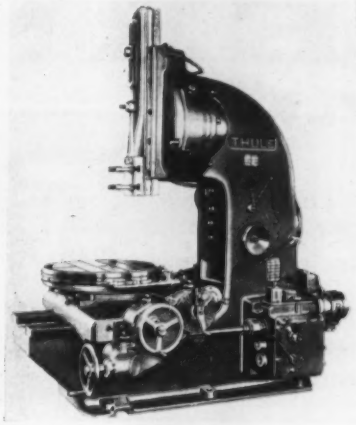
FLYWHEEL or back-geared models of these presses are available. Capacities of the OBI units range from 7 to 100 tons (56-ton Model 5 shown).



They have heavy, one-piece cast iron frames of high tensile strength, insuring rigidity, high vibration dampening, and ability to withstand deflection without permanent deformation. *Write*: Federal Press Co., Division Street, Elkhart, Ind. *Phone*: 2-5115

Shaper Does Contours With One Setup

HERE is a machine that eliminates complicated tooling and trims production time on parts with regular,



irregular, internal, or external contours. Reason: You can do them in one setup.

The vertical shaper has a 24 in. diameter rotary table arranged for crank and direct indexing. Longitudinal, transverse, and rotary movements can be made by hand or power feed. The ram swivels 12 degrees.

The machine also has a ram return at twice the cutting speed (15 to 75 strokes a minute), power rapid traverse in three directions, and a V-belt drive from a 5 hp main motor. For more information, *write* Austin Industrial Corp., 76 Mamaroneck Ave., White Plains, N. Y.

Instrument Unscrambles Mix-Ups in Metal Parts

NONDESTRUCTIVE testing and sorting of accidentally mixed or incorrectly processed metal parts can be done quickly with the Model C-2 Cyclograph.

It can be used on ferrous or nonferrous metal and will sort raw stock, semifinished, or finished parts by their metallurgical characteristics (analysis, hardness, structure, case depth). A known part is used as a standard to adjust the instrument.

The Cyclograph can be used as a hand sorter or it can be hooked up to a relay unit which makes it possible to sort thousands of parts a day. The relay unit sends out a reject signal which can be used to operate a reject gate, paint spray marking device, or other mechanisms.

For more information, *write* J. W. Dice Co., Englewood, N. J.

NEW literature

Write directly to the company for a copy

Casting Reference Chart

Fifty-five widely used cast alloys in the carbon, low alloy, and stainless steel groups, and nickel and Monel are listed on a chart. Properties and design applications are given for each alloy. Lebanon Steel Foundry, 156 Lehman St., Lebanon, Pa.

Fan Noise Calculator

A slide rule type fan noise calculator combines several acoustical formulas to give accurate predictions of room noise levels resulting from fan additions. It covers rooms of various sizes with varying degrees of acoustical treatment. Propellair Div., Robbins & Myers Inc., Springfield, Ohio.

Rack Reference Library

Reference literature includes a 24-page course on storage rack design and construction, a 12-page booklet on fixtures, a combination of capacity graphs (I-beam, channel, and pipe), and 12 case histories of industrial storage problems that were solved. Tube-Strut Corp., 2960 Marsh St., Los Angeles 39, Calif.

Heat Treating Chart

A simplified chart makes it possible to relate application requirements directly to furnace and atmosphere equipment. It lists all major heat treating categories and recommends specific equipment for each. C. I. Hayes Inc., 822 Wellington Ave., Cranston 10, R. I.

Welding Rod Chart

A welding shop wall chart of 89 specialty alloys and fluxes sorts out the criteria that should be taken into consideration in alloy selection. Maintenance, production, and installation jobs are covered. All-State Welding Alloys Co. Inc., White Plains, N. Y.

Ohio Valley Streams Report

Cleaner streams and the development of robot monitors to maintain a continuous check on their cleanliness are forecast in this commission's annual report. Ohio River Valley Water Sanitation Commission, 414 Walnut St., Cincinnati 2, Ohio.

Ferromanganese-Silicon

Savings in manganese costs for stainless steel producers resulting from the use of ferromanganese-silicon are described in a folder. Depending on practice, the material can cut $8 to $10 off the cost of manganese for each ton of high-manganese grades. Electro Metallurgical Co., division of Union Carbide Corp., 30 E. 42nd St., New York 17, N. Y.

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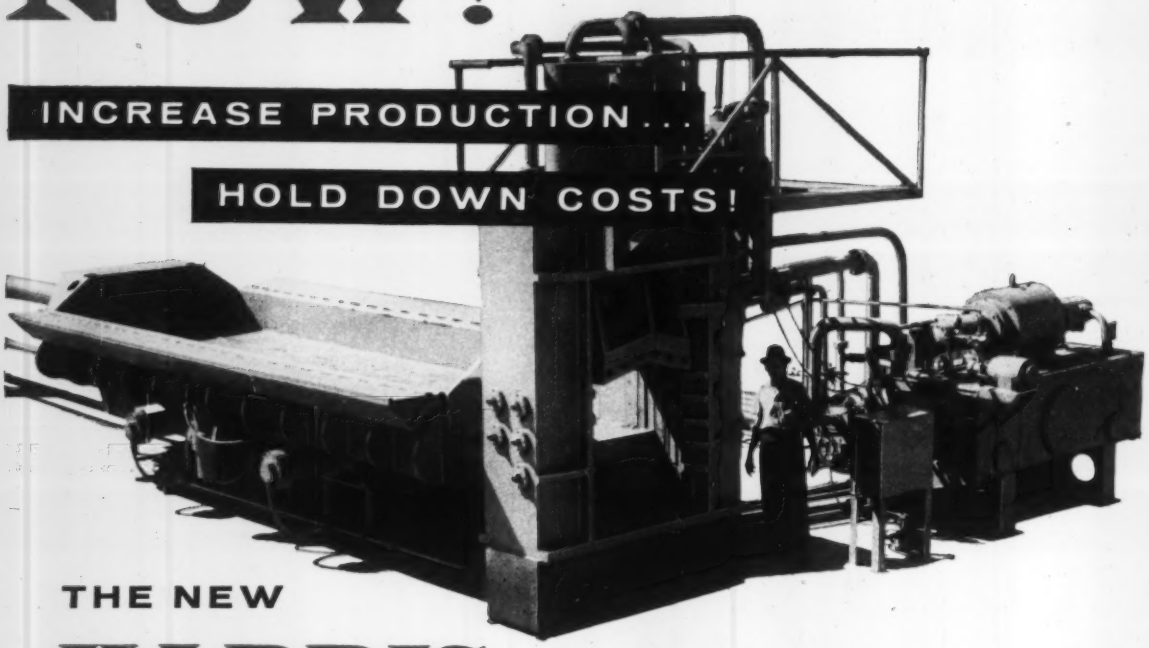
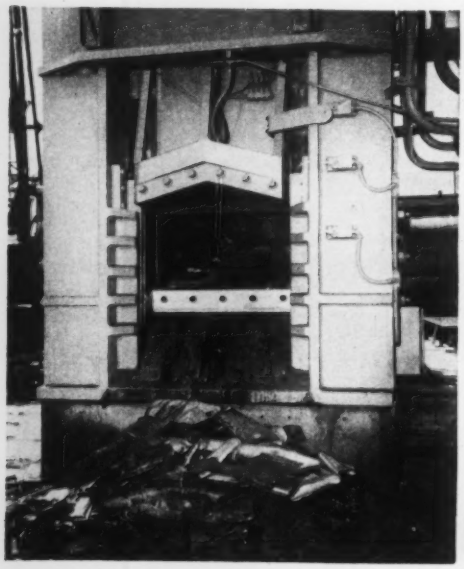


THE NEW

HARRIS BS-350 BALER-SHEAR

AUTO FRAMES and bulky scrap work through easily. The Harris Baler-Shear was designed to eliminate problems arising from the preparation of bulky scrap. It incorporates the principles of baling and shearing.



SPECIFICATIONS

size of charging box	264 x 83 x 41"
shear opening height	20"
shear opening width	36"
shear force	350 tons
floor space required	55' x 20'

HARRIS FOUNDRY & MACHINE CO.

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CORDELE, GEORGIA

Talk with a Man from Harris

With Stocks at Low Ebb, Rush Is on

January 26, 1959

DEMAND for steel is rising rapidly as consumers strive to replenish low inventories. Fabricators who let their stockpiles decline last year are suddenly realizing that they don't have enough metal on hand to sustain high production.

Long accustomed to quick service from the mills, they're scrambling for eight week delivery promises on cold-rolled sheets.

For steelmakers, it's a refreshing change. Says one: "I've still got my problems, but I'd rather worry on a full order book." For buyers, it's often a nightmare.

INVENTORIES TOO LOW— Inventories of finished steel reached an all-time high (about 24 million tons) in June, 1957, when the recession hit. Fabricators began to liquidate their stocks. Reductions continued until September, 1958, when inventories bottomed out at 13 million tons. Users increased their stocks slightly in October. Canmakers hedged against higher tin plate prices; automotive inventories grew as strikes curtailed production, but the fourth quarter buildup was less than 1 million tons.

In the last two months, shipments have exceeded consumption by a small margin, but if the United Steelworkers struck tomorrow, they'd catch consumers in their worst inventory position in about eight years.

BUILDUP GAINS MOMENTUM— Demand for flat-rolled products is mounting as users set their sights on two objectives: 1. Getting inventories up to normal. 2. Adding extra tonnage for strike protection. Ford Motor Co. gave the movement impetus when it urged suppliers of parts to buy ahead for the '59 model run (but didn't guarantee to take the steel off their hands). Ford is telling steelmakers that it will double up on orders in the spring, taking five months' tonnage in two. General Motors told suppliers long ago that it would go into a gradual buildup in the first half. Automakers' steel inventories are thought to be at the 15 to 20 day level. It's believed that they'll be boosted to 60 days before June 30.

ALLOCATIONS COMING?— It's rumored in some quarters that major steelmakers may put cold-rolled sheets on allocation during the second quarter, but company spokesmen say such talk is premature. "We'll have to see what happens in the next 30 days," a sales executive comments. "The current bulge in orders may just be temporary." Taking an opposite stand (though he foresees no allocations), a market analyst declares: "I think we'll see a strong demand until June. It will spread from one product to another."

PLATES MAY BE NEXT— At the moment, cold-rolled, galvanized, and aluminum coated sheets are in tightest supply. (There has been a modest pickup in demand for hot-rolled sheets, but most grades are available on two to four weeks' leadtime.) Bars usually follow sheets, but many observers think plates will be next on the list of hard-to-get items. Reasons: 1. Railroads are beginning to repair and replace old equipment. 2. Reversal of the Memphis court decision (affecting the rate setting practices of gas transmission companies) has stimulated demand for line pipe.

INGOT RATE ADVANCES — Last week, steelmaking operations climbed half a point to 75 per cent of capacity. Production was about 2,123,000 net tons of steel for ingots and castings. STEEL's composite price on No. 1 heavy melting scrap advanced 34 cents to $40.67 a ton.

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*Current prices were published in the Jan. 5 issue and will appear in subsequent issues.

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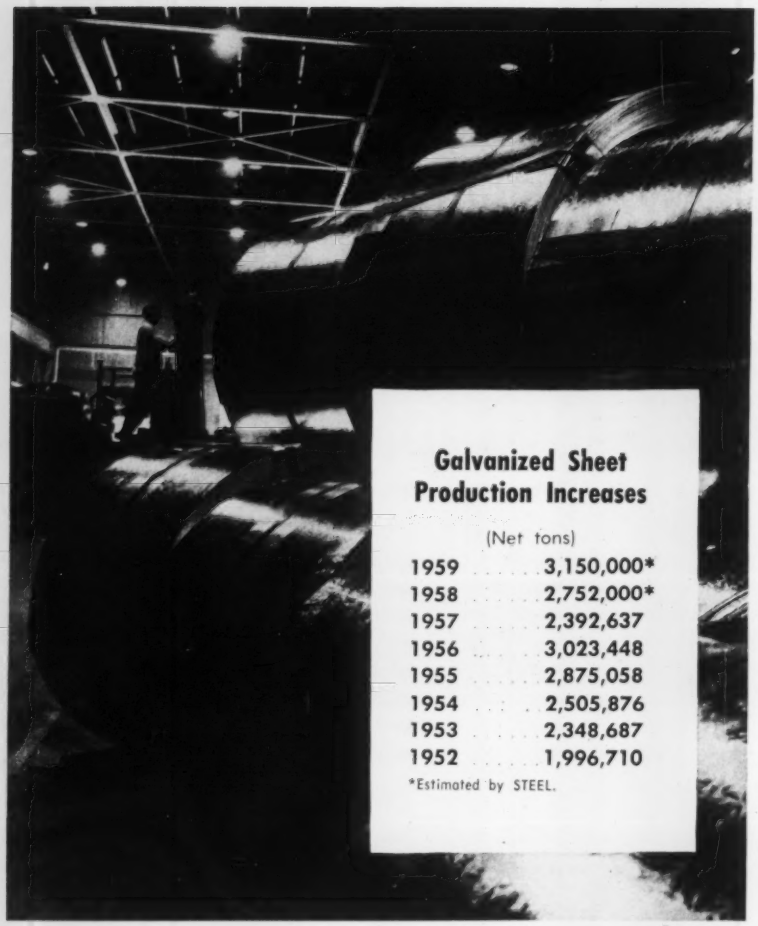

Jones & Laughlin Steel Corp.

Galvanizers Step Up Pace

Predict 1959 production will be better than 1958's even if a steel strike should kill the third quarter. Housing and farm demand will be the strongest

GALVANIZED SHEETS, one of the few products that bucked the 1958 recession, are still going strong. Look for a 20 per cent improvement in production this year. (That's the consensus of producers queried last week by STEEL.)

Most galvanizers are operating close to capacity and expect to continue the pace until the beginning of the third quarter.

Production in '58 was about 2,752,000 tons, some 360,000 tons above the '57 mark (see table above).

• **The Future** — Predictions are fogged by the possibility of a steel strike in July. One eastern zinc producer makes this forecast: First and second quarters, fairly good; third, poor; final, excellent. Result: A 15 to 20 per cent gain over 1958. His reasoning: Consumers are going to hedge against a strike threat by building up stocks. By the third quarter, a strike or big inventories will cause a slump. Whichever happens, the third quarter will see a deep dip followed by a rapid upturn.

Most active areas will probably be housing and farm applications. Prefabricated constructions appear to have great potential. Most producers say it would be a mistake to count on a government grain bin program in 1959.

• **Exports**—Sales for export dropped in 1958. Most producers don't expect improvement this year. European producers are shipping sheets at prices that U. S. makers can't meet. But, as one said with relief: "Fortunately, we've never depended heavily on the foreign market. Export sales are a small percentage of our business."

• **Why It Sold** — Early in 1958, Ralph Miller, galvanized products manager, Jones & Laughlin Steel Corp., predicted that shipments would be about 2.4 million tons. Here's why he underestimated:

1. Unexpectedly numerous new housing starts meant big tonnages were needed in heating and ventilating. 2. Farmers invested in new grain bins to handle a bumper harvest. 3. Air conditioners were bigger sellers than anticipated. 4. Road building swelled during the last half, increasing demand for culverts and drainage pipe. 5. The end of the year saw users beginning inventory replenishment, offsetting the usual seasonal slump.

• **Where It Went**—Analysis of last year's shipments: 36.5 per cent was accounted for by contractors' products (culverts and concrete pipe, air conditioning and ventilating equipment, plumbing and central heating equipment, builders' hardware); 31.5 per cent went into warehouses and to distributors; agricultural machinery chewed up another 7.6 per cent. Smaller consumers, such as construction (5.8 per cent) and the automotive industry (4.2 per cent), took the rest.

• **Competition**—Galvanizers wince at the mention of aluminum, but they don't fear it. They're convinced a counter to the magnificent selling job turned in by the aluminum people is all that's needed.

It's doubted that aluminum sheets

will compete to any great extent with galvanized steel. The two products don't have enough properties in common to make them consistent competitors for the same jobs. But aluminum coated steel may give galvanizers trouble. One steel company estimates that aluminized steel products will walk off with about 40 per cent of the market once the price differential has been reduced to about 10 per cent.

Most galvanizers disagree. A midwesterner points out that almost all aluminized steel is used for mufflers while a tremendous tonnage of galvanized steel goes into roofing and siding where the aluminized product would be no better.

He adds: "Aluminized steel competes with stainless, aluminum, and porcelain enameled steel in the curtain wall construction of large buildings. Galvanizers have never been a factor in that market anyway."

• **Problem Solved**—Next spring, the American Iron & Steel Institute's committee on galvanized sheet steel research will publish (in conjunction with the National Paint, Lacquer & Varnish Association) directions on the best ways to paint galvanized sheets. Successful painting could overcome a big aluminum advantage: Appearance.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 104 & 105

Automotive part suppliers started to increase their sheet steel inventories about two weeks ago. Other consumers are now following suit. Result: Deliveries are lengthening, cold rolled being pushed back about six weeks; hot rolled, two to three.

Demand for cold-rolled sheets is snowballing as users prepare for a possible midyear steel strike. Car manufacturers are stepping up their orders in the belief they should have 60 days' steel supply on hand by June 30. Also, appliance makers are more actively seeking additional tonnage.

Most users realize they'll have little chance of getting steel in June, so they're going to try to fill their requirements no later than May. The buying rush will be greater than usual because consumers allowed stocks to fall.

It's rumored major sheetmakers may put cold rolled on allocation during second quarter. That talk may be a little premature, but with customers booking on longer leadtime—45 to 60 days—on those products in which the mills are solidly booked for first quarter, it would not be surprising if something like allocation were effected before too long. Already some mills are making sure customers' orders are consistent with some historical yardstick—like purchases in 1957-58.

Steel Bars . . .

Bar Prices, Page 103

Markets for cold-finished bars are firming up as automotive suppliers enlarge their inventories. Manufacturers of screw machine products have the green light to expand their inventories sizably before June 1. Stocks at auto plants remain at the 15 to 20 day level, it's estimated, but there have been a few additions to monthly releases, though no big increases. The larger companies will

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want sufficient inventories for two months by June 30, but their buying programs will be orderly.

Automotive releases for February will be bigger than January's, but shipments will not be noticeably larger because of the fewer working days in the month.

Plymouth Steel Corp., Detroit, has booked a contract for 140 tons of cold-finished bars (5 in. rounds, turned and polished, grade C-1110) for the Naval ordnance plant at Louisville.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 104

Production of reinforcing steel bars is seasonally off, but interest in spring requirements is beginning to show up in the markets. Municipal and state road needs are expected to come out in volume soon.

Demand for wire mesh is picking up. The State of Michigan recently began letting paving contracts for 1960 and 1961. As contractors receive contracts they are placing long range orders for wire paving fabric.

One Detroit area mill indicates that on this basis it has a comfortable backlog, although production of the mesh won't start for some months.

Tide of Imported Steel Unchecked in Southwest

Southwestern steelmakers are finding it increasingly difficult to compete with imports. During December, 19,631 tons of reinforcing bars came through the port of Houston. For all of 1958, reinforcing bar imports through Texas ports amounted to 130,108 tons.

A local mill cites figures illustrating how imports are affecting domestic sales. During 1955, when imports began to expand, 3800 tons of wire were brought in through Texas ports, while the local mill sold 29,000 tons. By 1958, wire imports had risen to 16,700 tons, and the local mill's sales had fallen to 11,000 tons.

Tubular Goods . . .

Tubular Goods Prices, Page 107

Seamless pipe mills are operating close to capacity. They're increasing their inventories, and their customers are placing larger orders. Oil companies need the popular sizes of tubing, casing, and drill pipe for immediate use. In addition, they're concerned about a possible steel strike at midyear. Many are asking for first quarter delivery of all the pipe they've ordered for the first half.

A Pittsburgh producer of oil country goods says it'll ship about 5 per cent more this month than it did in December. But its billings won't be as great, for the reason it has a Jan. 26 cutoff date. Sales after that date will be billed in February. December billings were for 31 days.

Japanese tubing is being sold on world markets at prices 20 per cent under those quoted by other producers, reports a spokesman for Mannesmann Tube Co., Sault Ste. Marie, Ontario.

Oil field supply distributors anticipate stronger demand for tubular goods this year. Some 53,000 U. S. wells will be drilled, vs. 49,000 during 1958, forecasts in-

New Invention Picks Up 40 Cu. Yd. Detachable Containers . . . 15-Ton Loads

Dinosaur picks up in excess of 30,000 pounds of granular material, white line inside container indicates load has not shifted.

DEMPSTER-DINOSAUR Handles Containerized Cargo, Waste and Raw Materials . . .

The newly developed DEMPSTER-DINOSAUR is a system of materials handling that employs giant containers up to 40 cubic yards and larger. It lends itself to any situation where bulk accumulations of raw materials, liquids, waste or finished products must be handled. Since one truck and one driver can automatically pick up, haul and dump or set down a number of containers, the DINOSAUR easily does the work of several trucks.

Container is shown locked into carrying position.

Two models are available — one for tandem trucks, handles 30,000 pounds; the other, for single axle trucks, handles 22,000 pounds. Special off-the-road models are available for loads limited only by the capacity of the truck.

Free Booklet Offered

A free booklet which describes the operation of this new system in detail is offered by the manufacturer.

Mfd. By Patents Pending

DEMPSTER BROTHERS, Inc.

Dept. S-1, Knoxville 17, Tenn.

dicate. Also, many consumers have worked off large pipe inventories and will be returning to the market. Starting last October, buying has been on the upgrade.

Mechanical tubing shipments have lengthened to five-six weeks in the New England market largely due to automotive buying. Pressure tubing shipments are also more extended in the district.

Plates . . .

Plate Prices, Page 103

Should inventories be built up now as a safeguard against a midyear steel strike?

Plate fabricators are asking themselves that question as they contemplate the reasonably comfortable supply situation.

Demand is a little better than it was but not enough to cause any excitment among suppliers.

Deliveries are more extended than they were. They run four to five weeks, against two to three a month or so back. But some suppliers still are offering January shipment and say business is under December's level.

Jobbing shops are reluctant to lay in steel against future needs that are hard to anticipate. Buyers who expanded their inventories in the closing quarter of 1958 in anticipation of an increase in extras, now are reviewing their supply position.

In some cases hedge buying against a midyear steel strike is appearing—purchasers are being authorized to order enough plates during first quarter to meet first half requirements.

Stainless Steel . . .

Stainless Steel Prices, Page 107

Stainless steel rings and discs machine cut to size, with tolerances close enough and edges smooth enough for many applications without further processing, can now be had from Joseph T. Ryerson & Son Inc., Chicago.

Principal requirements for stainless steel rings and discs are in Types 304 and 316, and in the extra low carbon analyses, Types 304L and 316L. They can also be furnished in other analyses.

Wire . . .

Wire Prices, Pages 105 & 106

Demand for wire products in the East is reported to be nearly 40 per cent ahead of last quarter's rate. The possibility of a steel strike at midyear is thought to be generating hedge buying by consumers, and it is expected to increase as the weeks pass.

Distributors . . .

Prices, Page 108

Business at steel service centers isn't up to expectations. It's still substantially below the year-ago level and will probably show only a gradual pickup as the quarter progresses. Competition for orders remains stiff. In several districts, imports are especially strong.

Demand for bars is described as poor. Structurals are still weak. Plate customers are expressing a little more optimism but have not booked any substantial tonnages.

Supplies are ample in all product categories, although sheets are beginning to tighten a bit. Users of flat-rolled products are likely to start hedging soon because of the possibility of a steel strike at midyear.

Rails, Cars . . .

Track Material Prices, Page 108

Chicago & Northwestern Railroad last week announced it will spend $16,700,000 this year for locomotives, freight cars, and suburban equipment. The road's capital expenditures for the year will total $24 million.

Also, Chicago, Burlington & Quincy Railroad announced heavy scheduling of repairs on about 4700 freight cars at is Havelock shops near Lincoln, Nebr. This is a $7.5 million program.

Refractories . . .

Refractories Prices, Page 109

A basic refractories production plant, costing $2 million, will be built at Tarentum, Pa., by A. P. Green Fire Brick Co., Mexico, Mo. The first unit will have about 50,000 sq ft of floor space.

W. G. Maloney has been appointed plant manager, and Ray A. Witschey, sales manager.

The company's Pittsburgh sales office will be consolidated with the new plant office, and will be under J. B. Allardice, district sales manager.

DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

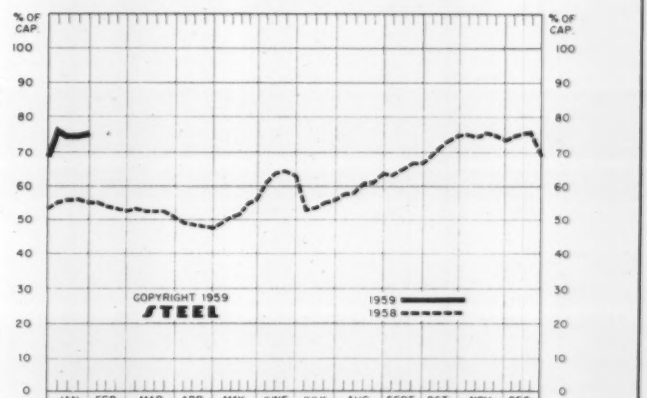
	Week Ended Jan. 25	Change	Same Week 1958	1957
Pittsburgh	76	— 1*	58	100
Chicago	83	+ 2*	58.5	98.5
Eastern	75	0	74	99
Youngstown	65	+ 1	55	100
Wheeling	81	— 3	56.5	100
Cleveland	85	+ 1.5*	44	94
Buffalo	71	+ 7.5	53.5	105
Birmingham	70.5	0	55.5	98
Cincinnati	88	+ 3*	56.5	92.5
St. Louis	89	— 0.5	69.5	98
Detroit	96	+ 0.5*	51	105.5
Western	82	+ 8	75	105
National Rate	75	+ 0.5	55.5	97.5

INGOT PRODUCTION‡

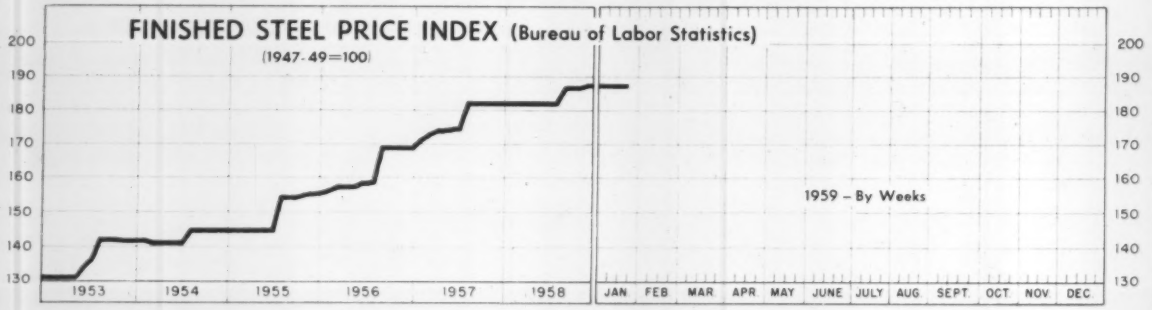
	Week Ended Jan. 25	Week Ago	Month Ago	Year Ago
INDEX (1947-49=100)	133.7†	131.4	114.5	93.1
NET TONS (In thousands)	2,147†	2,111	1,840	1,496

*Change from preceding week's revised rate. †Estimated. ‡American Iron & Steel Institute. Weekly capacity (net tons): 2,831,331 in 1959; 2,699,173 in 1958; 2,559,490 in 1957.

NATIONAL STEELWORKS OPERATIONS



Price Indexes and Composites



Jan. 20, 1959	Week Ago	Month Ago	Dec. Avg	Year Ago
187.0	187.0	186.9	186.9	181.7

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Jan. 20

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825	Bars, Reinforcing	6.385
Rails, Light, 40 lb	7.292	Bars, C.F., Carbon	10.710
Tie Plates	6.875	Bars, C.F., Alloy	14.125
Axles, Railway	10.175	Bars, C.F., Stainless, 302 (lb)	0.570
Wheels, Freight Car, 33 in. (per wheel)	62.000	Sheets, H.R., Carbon	6.350
Plates, Carbon	6.350	Sheets, C.R., Carbon	7.300
Structural Shapes	6.167	Sheets, Galvanized	8.695
Bars, Tool Steel, Carbon (lb)	0.560	Sheets, C.R., Stainless, 302 (lb)	0.688
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680	Sheets, Electrical	12.625
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400	Strip, C.R., Carbon	9.489
Bars, Tool Steel, H.R., Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.895	Strip, C.R., Stainless, 430 (lb)	0.493
Bars, H.R., Alloy	10.775	Strip, H.R., Carbon	6.250
Bars, H.R., Stainless, 303 (lb)	0.543	Pipe, Black, Buttweld (100 ft)	19.903
Bars, H.R., Carbon	6.675	Pipe, Galv., Buttweld (100 ft)	23.583
		Pipe, Line (100 ft)	199.53
		Casing, Oil Well, Carbon (100 ft)	201.080
		Casing, Oil Well, Alloy (100 ft)	315.213
		Tubes, Boiler (100 ft)	51.200
		Tubing, Mechanical, Carbon (100 ft)	26.157
		Tubing, Mechanical, Stainless, 304 (100 ft)	205.608
		Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
		Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
		Black Plate, Canmaking Quality (95 lb base box)	7.900
		Wire, Drawn, Carbon	10.575
		Wire, Drawn, Stainless 430 (lb)	0.665
		Bale Ties (bundles)	7.967
		Nails, Wire, 8d Common	9.828
		Wire, Barbed (80-rod spool)	8.719
		Woven Wire Fence (20-rod roll)	21.737

STEEL's FINISHED STEEL PRICE INDEX*

	Jan. 21 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	239.15	189.74
Index in cents per lb	6.713	6.713	6.713	6.479	5.140

STEEL's ARITHMETICAL COMPOSITES*

Finished Steel, NT	$149.96	$149.96	$149.96	$145.42	$113.91
No. 2 Fdry. Pig Iron, GT.	66.49	66.49	66.49	66.49	56.54
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	56.04
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	57.27
Steelmaking Scrap, GT	40.67	40.33	39.67	34.25	29.17

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL

	Jan. 21 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.425	4.15
Bars, H.R., Chicago	5.675	5.675	5.675	5.425	4.15
Bars, H.R., deld. Philadelphia	5.975	5.975	5.975	5.725	5.302
Bars, C.F., Pittsburgh	7.65*	7.65*	7.65*	7.30*	5.20
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.275	4.10
Shapes, Std., Chicago	5.50	5.50	5.50	5.275	4.10
Shapes, deld., Philadelphia	5.77	5.77	5.77	5.545	4.38
Plates, Pittsburgh	5.30	5.30	5.30	5.10	4.10
Plates, Chicago	5.30	5.30	5.30	5.10	4.10
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.10	4.35
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.10	4.10
Plates, Claymont, Del.	5.30	5.30	5.30	5.10	4.55
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	4.925	3.925
Sheets, H.R., Chicago	5.10	5.10	5.10	4.925	3.925
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.05	4.775
Sheets, C.R., Chicago	6.275	6.275	6.275	6.05	4.775
Sheets, C.R., Detroit	6.275	6.275	6.275	6.05-6.15	4.975
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.60	5.275
Strip, H.R., Pittsburgh	5.10	5.10	5.10	4.925	4.425
Strip, H.R., Chicago	5.10	5.10	5.10	4.925	3.925
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.15	5.45
Strip, C.R., Chicago	7.425	7.425	7.425	7.15	5.70
Strip, C.R., Detroit	7.425	7.425	7.425	7.25	5.45-6.05
Wire, Basic, Pittsburgh	8.00	8.00	8.00	7.65	5.525
Nails, Wire, Pittsburgh	8.95	8.95	8.95	8.95	6.55
Tin plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.30	$8.95

*Including 0.35c for special quality.

SEMIFINISHED STEEL

Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$96.00	$75.50
Wire rods $\frac{7}{32}$-$\frac{5}{8}$" Pitts.	6.40	6.40	6.40	6.15	4.525

PIG IRON, Gross Ton

	Jan. 21 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pitts.	$67.00	$67.00	$67.00	$67.00	$57.00
Basic, Valley	66.00	66.00	66.00	66.00	56.00
Basic, deld., Phila.	70.41	70.41	70.41	70.01	60.75
No. 2 Fdry, Neville Island, Pa.	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, deld., Phila.	70.91	70.91	70.91	70.51	61.25
No. 2 Fdry, Birm.	62.50	62.50	62.50	62.50	52.88
No. 2 Fdry (Birm.) deld. Cin.	70.20	70.20	70.20	70.20	60.43
Malleable, Valley	66.50	66.50	66.50	66.50	56.50
Malleable, Chicago	66.50	66.50	66.50	66.50	56.50
Ferromanganese, net ton†	245.00	245.00	245.00	245.00	200.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pittsburgh	$43.50	$42.50	$42.50	$32.50	$30.50
No. 1 Heavy Melt, E. Pa.	36.00	36.00	34.00	37.75	28.00
No. 1 Heavy Melt, Chicago	42.50	42.50	42.50	32.50	29.00
No. 1 Heavy Melt, Valley	43.50	43.50	42.50	30.50	29.50
No. 1 Heavy Melt, Cleve.	40.50	39.50	39.00	27.50	28.50
No. 1 Heavy Melt, Buffalo	35.50	35.50	33.50	28.50	25.00
Rails, Rerolling, Chicago	62.50	62.50	62.50	50.50	38.00
No. 1 Cast, Chicago	47.50	46.50	45.50	39.50	32.50

COKE, Net Ton

Beehive, Furn., Connlsvl.	$15.25	$15.25	$15.25	$15.25	$14.75
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	18.25	16.75
Oven, Fdry., Milwaukee	30.50	30.50	30.50	30.50	25.25

Steel Prices

Mill prices as reported to STEEL, Jan. 21, cents per pound except as otherwise noted. Changes shown in italics. Code number following mill points indicates producing company. Key to producers, page 104, footnotes, page 106.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 .....$76.00

INGOTS, Alloy (NT)
Detroit S41 .....$82.00
Economy,Pa. B14 ....82.00
Farrell,Pa. S3 .....82.00
Lowellville,O. S3 .....82.00
Midland,Pa. C18 .....82.00
Munhall,Pa. U5 .....82.00
Sharon,Pa. S3 .....82.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bartonville,Ill. K4 ....$82.00
Bessemer,Pa. U5 .....80.00
Buffalo R2 .....80.00
Clairton,Pa. U5 .....80.00
Ensley,Ala. T2 .....80.00
Fairfield,Ala. T2 .....80.00
Fontana,Calif. K1 ....90.50
Gary,Ind. U5 .....80.00
Johnstown,Pa. B3 ....80.00
Lackawanna,N.Y. B2..80.00
Munhall,Pa. U5 .....80.00
Owensboro,Ky. G8 ....80.00
S.Chicago,Ill. R2, U5 ..80.00
S.Duquesne,Pa. U5 ....80.00
Sterling,Ill. N15 ....80.00
Youngstown R2 .....80.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$99.50
Buffalo R2 .....99.50
Canton,O. R2 .....102.00
Clairton,Pa. U5 .....99.50
Conshohocken,Pa. A3..104.50
Ensley,Ala. T2 .....99.50
Fairfield,Ala. T2 .....99.50
Farrell,Pa. S3 .....99.50
Fontana,Calif. K1 ....109.00
Gary,Ind. U5 .....99.50
Geneva,Utah C11 .....99.50
Houston S5 .....104.50
Johnstown,Pa. B2 ....99.50
Lackawanna,N.Y. B2..99.50
LosAngeles B3 .....109.00
Midland,Pa. C18 .....99.50
Munhall,Pa. U5 .....99.50
Owensboro,Ky. G8 ....99.50
Seattle B3 .....113.00
Sharon,Pa. S3 .....99.50
S.Chicago R2, U5, W14..99.50
S.Duquesne,Pa. U5 ....99.50
S.SanFrancisco B3 ....109.00
Warren,O. C17 .....99.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ..$119.00
Bridgeport,Conn. C32..119.00
Buffalo R2 .....119.00
Canton,O. R2, T7 ....119.00
Conshohocken,Pa. A3..126.00
Detroit S41 .....119.00
Economy,Pa. B14 ....119.00
Farrell,Pa. S3 .....119.00
Fontana,Calif. K1 ....140.00
Gary,Ind. U5 .....119.00
Houston S5 .....124.00
Ind.Harbor,Ind. Y1 ..119.00
Johnstown,Pa. B2 ....119.00
Lackawanna,N.Y. B2..119.00
LosAngeles B3 .....139.00
Lowellville,O. S3 ....119.00
Massillon,O. R2 .....119.00
Midland,Pa. C18 .....119.00
Munhall,Pa. U5 .....119.00
Owensboro,Ky. G8 ....119.00
Sharon,Pa. S3 .....119.00
S.Chicago R2,U5,W14.119.00
S.Duquesne,Pa. U5 ..119.00
Struthers,O. Y1 .....119.00
Warren,O. C17 .....119.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 .....$122.50
Canton,O. R2 .....125.00
Cleveland R2 .....122.50
Gary,Ind. U5 .....122.50
S.Chicago,Ill. R2, W14 122.50
S.Duquesne,Pa. U5 ..122.50
Warren,O. C17 .....122.50

SKELP
Aliquippa,Pa. J5 .....5.05
Munhall,Pa. U5 .....5.05
Pittsburgh J5 .....5.05
Warren,O. R2 .....5.05
Youngstown R2, U5 ....5.05

WIRE RODS
AlabamaCity,Ala. R2 ..6.40
Aliquippa,Pa. J5 .....6.40
Alton,Ill. L1 .....6.60
Bartonville,Ill. K4 ....6.50
Buffalo W12 .....6.40
Cleveland A7 .....6.40
Donora,Pa. A7 .....6.40
Fairfield,Ala. T2 .....6.40
Houston S5 .....6.65
IndianaHarbor,Ind. Y1..6.40
Johnstown,Pa. B2 .....6.40
Joliet,Ill. A7 .....6.40
KansasCity,Mo. S5 ....6.65
Kokomo,Ind. C16 .....6.50
LosAngeles B3 .....7.20
Minnequa,Colo. C10 ....6.65
Monessen,Pa. P7 .....6.40
N.Tonawanda,N.Y. B11 .6.40
Pittsburg,Calif. C11 ....7.20
Portsmouth,O. P12 ....6.40
Roebling,N.J. R5 .....6.50
S.Chicago,Ill. R2, W14..6.40
SparrowsPoint,Md. B2 ..6.50
Sterling,Ill.(1) N15 ....6.40
Sterling,Ill. N15 .....6.50
Struthers,O. Y1 .....6.40
Worcester,Mass. A7 ....6.70

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity,Ala. R2 ..5.50
Aliquippa,Pa. J5 .....5.50
Atlanta A11 .....5.70
Bessemer,Ala. T2 .....5.50
Bethlehem,Pa. B2 .....5.55
Birmingham C15 .....5.50
Clairton,Pa. U5 .....5.50
Fairfield,Ala. T2 .....5.50
Fontana,Calif. K1 ....6.30
Gary,Ind. U5 .....5.50
Geneva,Utah C11 .....5.50
Houston S5 .....5.60
Ind.Harbor,Ind. I-2, Y1.5.50
Johnstown,Pa. B2 .....5.55
Joliet,Ill. P22 .....5.50
KansasCity,Mo. S5 ....5.60
Lackawanna,N.Y. B2 ..5.55
LosAngeles B3 .....6.20
Minnequa,Colo. C10 ....5.80
Munhall,Pa. U5 .....5.50
Niles,Calif. P1 .....6.25
Phoenixville,Pa. P4 ....5.55
Portland,Oreg. O4 ....6.25
Seattle B3 .....6.25
S.Chicago,Ill. U5, W14..5.50
S.SanFrancisco B3 ....6.15
Sterling,Ill. N15 .....5.50
Torrance,Calif. C11 ....6.20
Weirton,W.Va. W6 ....5.50

Wide Flange
Bethlehem,Pa. B2 ....5.55
Clairton,Pa. U5 .....5.50
Fontana,Calif. K1 ....6.45
IndianaHarbor,Ind. I-2..5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 .....5.50
Phoenixville,Pa. P4 ....5.55
S.Chicago,Ill. U5 .....5.50
Weirton,W.Va. W6 ....5.50

Alloy Std. Shapes
Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....6.90
Munhall,Pa. U5 .....6.80
S.Chicago,Ill. U5, W14..6.80

H.S., L.A. Std. Shapes
Aliquippa,Pa. J5 .....8.05
Bessemer,Ala. T2 .....8.05
Bethlehem,Pa. B2 .....8.10
Clairton,Pa. U5 .....8.05
Fairfield,Ala. T2 .....8.05
Fontana,Calif. K1 ....8.85
Gary,Ind. U5 .....8.05
Geneva,Utah C11 .....8.05
Houston S5 .....8.15
Ind.Harbor,Ind. I-2, Y1.8.05
Johnstown,Pa. B2 .....8.10
KansasCity,Mo. S5 ....8.15
Lackawanna,N.Y. B2 ..8.10
LosAngeles B3 .....8.75
Munhall,Pa. U5 .....8.05
Seattle B3 .....8.80
S.Chicago,Ill. U5, W14..8.05
S.SanFrancisco B3 ....8.70
Struthers,O. Y1 .....8.05

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 .....8.10
Ind.Harbor,Ind. I-2 ....8.05
Lackawanna,N.Y. B2 ..8.10
Munhall,Pa. U5 .....8.05
S.Chicago,Ill. U5 .....8.05

PILING

BEARING PILES
Bethlehem,Pa. B2 .....5.55
Ind.Harbor,Ind. I-2 ....5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 .....5.50
S.Chicago,Ill. I-2, U5 ..5.50

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ....6.50
Lackawanna,N.Y. B2 ..6.50
Munhall,Pa. U5 .....6.50
S.Chicago,Ill. I-2, U5 ..6.50
Weirton,W.Va. W6 ....6.50

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..5.30
Aliquippa,Pa. J5 .....5.30
Ashland,Ky.(15) A10 ...5.30
Atlanta A11 .....5.50
Bessemer,Ala. T2 .....5.30
Clairton,Pa. U5 .....5.30
Claymont,Del. C22 .....5.30
Cleveland J5, R2 .....5.30
Coatesville,Pa. L7 .....5.30
Conshohocken,Pa. A3 ..5.30
Ecorse,Mich. G5 .....5.30
Fairfield,Ala. T2 .....5.30
Farrell,Pa. S3 .....5.30
Fontana,Calif.(30) K1 ..6.10
Gary,Ind. U5 .....5.30
Geneva,Utah C11 .....5.30
GraniteCity,Ill. G4 ....5.40
Harrisburg,Pa. P4 .....5.30
Houston S5 .....5.40
Ind.Harbor,Ind. I-2, Y1.5.30
Johnstown,Pa. B2 .....5.30
Lackawanna,N.Y. B2 ..5.30
Mansfield,O. E6 .....5.30
Minnequa,Colo. C10 ....6.15
Munhall,Pa. U5 .....5.30
Newport,Ky. A2 .....5.30
Pittsburgh J5 .....5.30
Riverdale,Ill. A1 .....5.30
Seattle B3 .....6.20
Sharon,Pa. S3 .....5.30
S.Chicago,Ill. U5, W14..5.30
SparrowsPoint,Md. B2 ..5.30
Sterling,Ill. N15 .....5.30
Steubenville,O. W10 ....5.30
Warren,O. R2 .....5.30
Youngstown U5, Y1 ....5.30
Youngstown(27) R2 ....5.30

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 ....7.05
Fontana,Calif. K1 ....7.85
Geneva,Utah C11 .....7.05
Houston S5 .....7.15
Johnstown,Pa. B2 .....7.05
SparrowsPoint,Md. B2 ..7.05

PLATES, Wrought Iron
Economy,Pa. B14 ....13.55

PLATES, H.S., L.A.
Aliquippa,Pa. J5 .....7.95
Ashland,Ky. A10 .....7.95
Bessemer,Ala. T2 .....7.95
Clairton,Pa. U5 .....7.95
Claymont,Del. C22 .....7.95
Cleveland J5, R2 .....7.95
Coatesville,Pa. L7 .....7.95
Conshohocken,Pa. A3 ..7.95
Economy,Pa. B14 .....7.95
Ecorse,Mich. G5 .....7.95
Fairfield,Ala. T2 .....7.95
Farrell,Pa. S3 .....7.95
Fontana,Calif.(30) K1 ..8.75
Gary,Ind. U5 .....7.95
Geneva,Utah C11 .....7.95
Houston S5 .....8.05
Ind.Harbor,Ind. I-2, Y1.7.95
Johnstown,Pa. B2 .....7.95
Munhall,Pa. U5 .....7.95
Pittsburgh J5 .....7.95
Seattle B3 .....8.85
Sharon,Pa. S3 .....7.95
S.Chicago,Ill. U5, W14..7.95
SparrowsPoint,Md. B2 ..7.95
Warren,O. R2 .....7.95
Youngstown U5, Y1 ....7.95

PLATES, ALLOY
Aliquippa,Pa. J5 .....7.50
Claymont,Del. C22 .....7.50
Coatesville,Pa. L17 .....7.50
Economy,Pa. B14 .....7.50
Farrell,Pa. S3 .....7.50
Fontana,Calif. K1 .....8.30
Gary,Ind. U5 .....7.50
Houston S5 .....7.60
Ind.Harbor,Ind. Y1 .....7.50
Johnstown,Pa. B2 .....7.50
Lowellville,O. S3 .....7.50
Munhall,Pa. U5 .....7.50
Newport,Ky. A2 .....7.50
Pittsburgh J5 .....7.50
Seattle B3 .....8.40
Sharon,Pa. S3 .....7.50
S.Chicago,Ill. U5, W14..7.50
SparrowsPoint,Md. B2..7.50
Youngstown Y1 .....7.50

FLOOR PLATES
Cleveland J5 .....6.375
Conshohocken,Pa. A3 ..6.375
Ind.Harbor,Ind. I-2 ..6.375
Munhall,Pa. U5 .....6.375
Pittsburgh J5 .....6.375
S.Chicago,Ill. U5 .....6.375

PLATES, Ingot Iron
Ashland c.l.(15) A10 ..5.55
Ashland l.c.l.(15) A10 ..6.05
Cleveland c.l. R2 .....6.05
Warren,O. c.l. R2 .....6.05

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ..5.675
Aliquippa,Pa.(9) J5 ..5.675
Alton,Ill. L1 .....5.875
Atlanta(9) A11 .....5.875
Bessemer,Ala.(9) T2 ..5.675
Birmingham(9) C15 ..5.675
Buffalo(9) R2 .....5.675
Canton,O.(23) R2 .....6.15
Clairton,Pa.(9) U5 ....5.675
Cleveland(9) R2 .....5.675
Ecorse,Mich.(9) G5 ..5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala.(9) T2 ..5.675
Fairless,Pa.(9) U5 ....5.825
Fontana,Calif.(9) K1 ..6.375
Gary,Ind.(9) U5 .....5.675
Houston(9) S5 .....5.925
Ind.Harbor(9) I-2, Y1..5.675
Johnstown,Pa.(9) B2 ..5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo.(9) S5 .5.925
Lackawanna(9) B2 ....5.675
LosAngeles(9) B3 .....6.375
Massillon,O.(23) R2 ...6.15
Midland,Pa.(23) C18 ..6.025
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
N.T'wan'a,N.Y.(23)B11 6.025
Owensboro,Ky.(9) G8 ..6.025
Pittsburg,Calif.(9) C11.6.375
Pittsburgh(9) J5 .....5.675
Portland,Oreg. O4 ....6.425
Riverdale,Ill.(9) A1 ..5.675
Seattle B3, N14 .....6.425
S.Ch'c'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5..5.675
S.SanFran.,Calif.(9) B3 6.425
Sterling,Ill.(1)(9) N15..5.675
Sterling,Ill.(9) N15 ....5.775
Struthers,O.(9) Y1 ....5.675
Tonawanda,N.Y. B12 ..5.675
Torrance,Calif.(9) C11.6.375
Warren,O. C17 .....6.025
Youngstown(9) R2, U5..5.675

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.725
Bethlehem,Pa. B2 ....6.725
Bridgeport,Conn. C32 ..6.80
Buffalo R2 .....6.725
Canton,O. R2, T7 ....6.725
Clairton,Pa. U5 .....6.725
Detroit S41 .....6.725
Economy,Pa. B14 .....6.725
Ecorse,Mich. G5 .....6.725
Fairless,Pa. U5 .....6.875
Farrell,Pa. S3 .....6.725
Fontana,Calif. K1 ....7.775
Gary,Ind. U5 .....6.725
Houston S5 .....6.975
Ind.Harbor,Ind. I-2, Y1..6.725
Johnstown,Pa. B2 .....6.725
KansasCity,Mo. S5 ....6.975
Lackawanna,N.Y. B2..6.725
LosAngeles B3 .....7.775
Lowellville,O. S3 .....6.725
Massillon,O. R2 .....6.725
Midland,Pa. C18 .....6.725
Owensboro,Ky. G8 .....6.725
Pittsburgh J5 .....6.725
Sharon,Pa. S3 .....6.725
S.Chicago R2, U5, W14 6.725
S.Duquesne,Pa. U5 ....6.725
Struthers,O. Y1 .....6.725
Warren,O. C17 .....6.725
Youngstown U5 .....6.725

BARS & SMALL SHAPES, H.R.
High-Strength, Low-Alloy
Aliquippa,Pa. J5 .....8.30
Bessemer,Ala. T2 .....8.30
Bethlehem,Pa. B2 .....8.30
Clairton,Pa. U5 .....8.30
Cleveland R2 .....8.30
Ecorse,Mich. G5 .....8.30
Fairfield,Ala. T2 .....8.30
Fontana,Calif. K1 .....9.00
Gary,Ind. U5 .....8.30
Houston S5 .....8.55
Ind.Harbor,Ind. Y1 .....8.30
Johnstown,Pa. B2 .....8.30
KansasCity,Mo. S5 .....8.55
Lackawanna,N.Y. B2 ..8.30
LosAngeles B3 .....9.00
Pittsburgh J5 .....8.30
Seattle B3 .....9.05
S.Chicago,Ill. R2, W14..8.30
S.Duquesne,Pa. U5 ....8.30
S.SanFrancisco B3 ....9.05
Struthers,O. Y1 .....8.30
Youngstown U5 .....8.30

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.825
Houston(9) S5 .....5.925
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
Sterling,Ill. N15 .....5.775
Sterling,Ill.(1) N15 ..5.675
Tonawanda,N.Y. B12 ..5.675

BAR SIZE ANGLES: S. Shapes
Aliquippa,Pa. J5 .....5.675
Atlanta A11 .....5.875
Joliet,Ill. P22 .....5.675
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
SanFrancisco S7 .....6.52
Seattle B3 .....6.425

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....7.05
KansasCity,Mo. S5 ....7.05
Pittsburgh J5 .....6.80
Youngstown U5 .....6.80

BARS, C.F. Loaded
(Including loaded extra)

Carbon
LosAngeles P2, S30 ..11.75*

Alloy
Ambridge,Pa. W18 ..10.175
BeaverFalls,Pa. M12 ..10.175
Camden,N.J. P13 .....10.35
Chicago W18 .....10.175
Elyria,O. W8 .....10.175
Monaca,Pa. S17 .....10.175
Newark,N.J. W18 .....10.35
SpringCity,Pa. K3 ....10.35

*Grade A; add 0.050c for Grade B.

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....7.65
BeaverFalls,Pa. M12,R2.7.65
Birmingham C15 .....8.25
Buffalo B5 .....7.70
Camden,N.J. P13 .....8.10
Carnegie,Pa. C12 .....7.65
Chicago W18 .....7.65
Cleveland A7, C20 .....7.65
Detroit B5, P17 .....7.85
Detroit S41 .....7.65
Donora,Pa. A7 .....7.65
Elyria,O. W8 .....7.65
FranklinPark,Ill. N5 ...7.65
Gary,Ind. R2 .....7.65
GreenBay,Wis. F7 .....7.65
Hammond,Ind. J5, L2 ..7.65
Hartford,Conn. R2 .....8.15
Harvey,Ill. B5 .....7.65
LosAngeles(49) S30 ...9.10
LosAngeles(49) P2, R2.9.10
Mansfield,Mass. B2 ....8.20
Massillon,O. R2, R8 ....7.65
Midland,Pa. C18 .....7.65
Monaca,Pa. S17 .....7.65
Newark,N.J. W18 .....8.10
NewCastle,Pa.(17) B4 ..7.65
Pittsburgh J5 .....7.65
Plymouth,Mich. P5 ....7.90
Putnam,Conn. W18 .....8.20
Readville,Mass. C14 ....8.20
S.Chicago,Ill. W14 .....7.65
SpringCity,Pa. K3 .....8.10
Struthers,O. Y1 .....7.65
Warren,O. C17 .....7.65
Waukegan,Ill. A7 .....7.65
Willimantic,Conn. J5 ...8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Carbon
(Turned and Ground)
Cumberland,Md. (5) C19.6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....9.025
BeaverFalls,Pa. M12,R2 9.025
Bethlehem,Pa. B2 .....9.025
Bridgeport,Conn. C32 ..9.175
Buffalo B5 .....9.025
Camden,N.J. P13 .....9.20
Canton,O. T7 .....9.025
Carnegie,Pa. C12 .....9.025
Chicago W18 .....9.025
Cleveland A7, C20 .....9.025
Detroit B5, P17 .....9.225
Detroit S41 .....9.025
Donora,Pa. A7 .....9.025
Elyria,O. W8 .....9.025
FranklinPark,Ill. N5 ...9.025
Gary,Ind. R2 .....9.025
GreenBay,Wis. F7 .....9.025
Hammond,Ind. J5, L2. 9.025
Hartford,Conn. R2 .....9.325
Harvey,Ill. B5 .....9.025
Lackawanna,N.Y. B2 ..9.025
LosAngeles P2, S30 ..11.00
Mansfield,Mass. B5 ...9.325
Massillon,O. R2, R8 ...9.025
Midland,Pa. C18 .....9.025
Monaca,Pa. S17 .....9.025
Newark,N.J. W18 .....9.20
Plymouth,Mich. P5 ....9.225
S.Chicago,Ill. W14 .....9.025
SpringCity,Pa. K3 .....9.20
Struthers,O. Y1 .....9.025
Warren,O. C17 .....9.025
Waukegan,Ill. A7 .....9.025
Willimantic,Conn. J5 ...9.325
Worcester,Mass. A7 ....9.325
Youngstown F3, Y1 ....9.025

BARS, Reinforcing, Billet (To Fabricators)

AlabamaCity,Ala. R2	.5.675
Atlanta A11	.5.675
Birmingham C15	.5.675
Buffalo R2	.5.675
Cleveland R2	.5.675
Ecorse,Mich. G5	.5.675
Emeryville,Calif. J7	.6.425
Fairfield,Ala. T2	.5.675
Fairless,Pa. U5	.5.825
Fontana,Calif. K1	.6.375
Ft.Worth,Tex(4)(26)T4	5.925
Gary,Ind. U5	.5.675
Houston S5	.5.925
Ind.Harbor,Ind. I-2, Y1	5.675
Johnstown Pa. B2	.5.675
Joliet,Ill. P22	.5.675
KansasCity,Mo. S5	.5.925
Kokomo,Ind. C16	.5.775
Lackawanna,N.Y. B2	.5.675
LosAngeles B3	.6.375
Madison,Ill. L1	.5.875
Milton,Pa. M18	.5.825
Minnequa,Colo. C10	.6.125
Niles,Calif. P1	.6.375
Pittsburg,Calif. C11	.6.375
Pittsburgh J5	.5.675
Portland,Oreg. O4	.6.425
SandSprings,Okla. S5	.5.925
Seattle B3, N14	.6.425
S.Chicago,Ill. R2, W14	5.675
S.Duquesne,Pa. U5	.5.675
S.SanFrancisco B3	.6.425
SparrowsPoint,Md. B2	.5.675
Sterling,Ill.(1) N15	.5.675
Sterling Ill. N15	.5.775
Struthers,O. Y1	.5.675
Tonawanda,N.Y. B12	.6.10
Torrance,Calif. C11	.6.375
Youngstown R2, U5	.5.675

BARS, Reinforcing, Billet (Fabricated; to Consumers)

Baltimore B2	.7.42
Boston B2, U8	.8.15
Chicago U8	.7.41
Cleveland U8	.7.39
Houston S5	.7.60
Johnstown,Pa. B2	.7.33
KansasCity,Mo. S5	.7.60
Lackawanna,N.Y. B2	.7.35
Marion,O. P11	.6.70
Newark,N.J. U8	.7.80
Philadelphia U8	.7.63
Pittsburgh J5, U8	.7.35
SandSprings,Okla. S5	.7.60
Seattle B3, N14	.7.95
SparrowsPt.,Md. B2	.7.33
St. Paul U8	.8.17
Williamsport,Pa. S19	.7.25

BARS, Wrought Iron

Economy,Pa.(S.R.)B14	14.90
Economy,Pa.(D.R.)B14	18.55
Economy(Staybolt)B14	19.00
McK.Rks.(S.R.) L5	14.50
McK.Rks.(D.R.) L5	19.80
McK.Rks.(Staybolt) L5	20.95

BARS, Rail Steel

ChicagoHts.(3) C2, I-2	5.575
ChicagoHts.(4) (44) I-2	5.675
ChicagoHts.(4) C2	.5.675
Franklin,Pa.(3) F5	.5.575
Franklin,Pa.(4) F5	.5.675
JerseyShore,Pa.(3) J8	.5.55
Marion,O.(3) P11	.5.575
Tonawanda(3) B12	.5.575
Tonawanda(4) B12	.6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Lackawanna,N.Y. B2	.5.10
Allenport,Pa. P7	.5.10
Aliquippa,Pa. J5	.5.10
Ashland,Ky.(8) A10	.5.10
Cleveland J5, R2	.5.10
Conshohocken,Pa. A3	.5.15
Detroit(8) M1	.5.10
Ecorse,Mich. G5	.5.10
Fairfield,Ala. T2	.5.10
Fairless,Pa. U5	.5.15
Farrell,Pa. S3	.5.10
Fontana,Calif. K1	.5.825
Gary,Ind. U5	.5.10
Geneva,Utah C11	.5.20
GraniteCity,Ill.(8) G4	.5.20
Ind.Harbor,Ind. I-2, Y1	5.10
Irvin,Pa. U5	.5.10
Lackawanna,N.Y. B2	.5.10
Mansfield,O. E6	.5.10
Munhall,Pa. U5	.5.10
Newport,Ky. A2	.5.10
Niles,O. M21, S3	.5.10
Pittsburg,Calif. C11	.5.80
Pittsburgh J5	.5.10
Portsmouth,O. P12	.5.10
Riverdale,Ill. A1	.5.10
Sharon,Pa. S3	.5.10
S.Chicago,Ill. U5, W14	.5.10
SparrowsPoint,Md. B2	.5.10
Steubenville,O. W10	.5.10
Warren,O. R2	.5.10
Weirton,W.Va. W6	.5.10
Youngstown U5, Y1	.5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3	.6.275

SHEETS, H.R. Alloy

Gary,Ind. U5	.8.40
Ind.Harbor,Ind. Y1	.8.40
Irvin,Pa. U5	.8.40
Munhall,Pa. U5	.8.40
Newport,Ky. A2	.8.40
Youngstown U5, Y1	.8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5	.7.525
Ashland,Ky. A10	.7.525
Cleveland J5, R2	.7.525
Conshohocken,Pa. A3	.7.575
Ecorse,Mich. G5	.7.525
Fairfield,Ala. T2	.7.525
Fairless,Pa. U5	.7.575
Farrell,Pa. S3	.7.525
Fontana,Calif. K1	.8.25
Gary,Ind. U5	.7.525
Ind.Harbor,Ind. I-2, Y1	7.525
Irvin,Pa. U5	.7.525
Lackawanna(35) B2	.7.525
Munhall,Pa. U5	.7.525
Niles,O. S3	.7.525
Pittsburgh J5	.7.525
S.Chicago,Ill. U5, W14	7.525
Sharon,Pa. S3	.7.525
SparrowsPoint(36) B2	.7.525
Warren,O. R2	.7.525
Weirton,W.Va. W6	.7.525
Youngstown U5, Y1	.7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10	.5.35
Cleveland R2	.5.875
Warren,O. R2	.5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2	.7.05
Middletown,O. A10	.6.775
Warren,O. R2	.7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2	.6.275
Allenport,Pa. P7	.6.275
Aliquippa,Pa. J5	.6.275
Cleveland J5, R2	.6.275
Conshohocken,Pa. A3	.6.325
Detroit M1	.6.275
Ecorse,Mich. G5	.6.275
Fairfield,Ala. T2	.6.275
Fairless,Pa. U5	.6.325
Follansbee,W.Va. F4	.6.275
Fontana,Calif. K1	.7.40
Gary,Ind. U5	.6.275
GraniteCity,Ill. G4	.6.375
Ind.Harbor,Ind. I-2, Y1	6.275
Irvin,Pa. U5	.6.275
Lackawanna,N.Y. B2	.6.275
Mansfield,O. E6	.6.275
Middletown,O. A10	.6.275
Newport,Ky. A2	.6.275
Pittsburg,Calif. C11	.7.225
Pittsburgh J5	.6.275
Portsmouth,O. P12	.6.275
SparrowsPoint,Md. B2	.6.275
Steubenville,O. W10	.6.275
Warren,O. R2	.6.275
Weirton,W.Va. W6	.6.275
Yorkville,O. W10	.6.275
Youngstown Y1	.6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5	.9.275
Cleveland J5, R2	.9.275
Ecorse,Mich. G5	.9.275
Fairless,Pa. U5	.9.325
Fontana,Calif. K1	.10.40
Gary,Ind. U5	.9.275
Ind.Harbor,Ind. I-2, Y1	9.275
Lackawanna(37) B2	.9.275
Pittsburgh J5	.9.275
SpparowsPoint(38) B2	.9.275
Warren,O. R2	.9.275
Weirton,W.Va. W6	.9.275
Youngstown Y1	.9.275

SHEETS, Culvert

	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.225	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	...7.225	7.75
Fairfield T2	....7.225	7.475
Gary,Ind. U5	....7.225	7.475
GraniteCity,Ill.G4	7.325	....
Ind.Harbor I-2	..7.225	7.475
Irvin,Pa. U5	....7.225	7.475
Kokomo,Ind. C16	.7.325	....
MartinsFry. W10	.7.225	7.475
Pitts.Calif. C11	..7.975	....
SparrowsPt. B2	..7.225	....
Pittsburgh J5	...7.225	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2	....7.475

SHEETS, Galvanized Steel Hot-Dipped

AlabamaCity,Ala. R2	.6.875‡
Ashland,Ky. A10	....6.875†
Canton,O. R2	.....6.875‡
Dover,O. E6	.....6.875†
Fairfield,Ala. T2	....6.875†
Gary,Ind. U5	.....6.875†
GraniteCity,Ill. G4	...6.975*
Ind.Harbor,Ind. I-2	..6.875†
Irvin,Pa. U5	.....6.875†
Kokomo,Ind. C16	....6.975‡
MartinsFerry,O. W10	.6.875*
Middletown, O. A10	..6.875†
Pittsburg,Calif. C11	..7.625*
Pittsburgh J5	.....6.875†
SparrowsPt.,Md. B2	..6.875†
Warren,O. R2	.....6.875†
Weirton,W.Va. W6	...6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Wall Casing

Fontana,Calif. K1	....7.325

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5	.....10.125
SparrowsPt.(39) B2	..10.025
Pittsburgh J5	.....10.125

SHEETS, Galvannealed Steel

Canton,O. R2	.....7.275
Irvin,Pa. U5	.....7.275

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10	.....7.125
Middletown,O. A10	....7.125

SHEETS, Electrogalvanized

Cleveland(28) R2	.....7.65
Niles,O.(28) R2	.....7.65
Youngstown J5	.....7.50
Weirton,W.Va. W6	....7.50

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1)	9.525
Butler,Pa. A10 (type 2)	9.625

SHEETS, Enameling Iron

Ashland,Ky. A10	.....6.775
Cleveland R2	.....6.775
Fairfield,Ala. T2	.....6.775
Gary,Ind. U5	.....6.775
GraniteCity,Ill. G4	....6.875
Ind.Harbor,Ind. I-2, Y1	6.775
Irvin,Pa. U5	.....6.775
Middletown,O. A10	....6.775
Niles,O. M21, S3	.....6.775
Youngstown Y1	.....6.775

BLUED STOCK, 29 Gage

Dover,O. E6	.....8.70
Follansbee,W.Va. F4	...8.70
Ind.Harbor,Ind. I-2	....8.70
Mansfield,O. E6	.....8.70
Warren,O. R2	.....8.70
Yorkville,O. W10	.....8.70

SHEETS, Long Terne, Steel (Commercial Quality)

BeechBottom,W.Va.W10	7.225
Gary,Ind. U5	.....7.225
Mansfield,O. E6	.....7.225
Middletown,O. A10	....7.225
Niles,O. M21, S3	....7.225
Warren,O. R2	.....7.225
Weirton,W.Va. W6	....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	....7.625

Key To Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E5 Elliott Bros. Steel Co.
E6 Empire-Reeves Steel Corp.
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron&Steel Co., Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div.,Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J&L Steel Corp.
S42 Southern Elec. Steel Co.

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope Corp.
U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring Corp.
W2 Wallingford Steel Corp.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ...5.10
Allenport,Pa. P7 .....5.10
Alton,Ill. L1 .....5.30
Ashland,Ky.(8) A10 ....5.10
Atlanta A11 .....5.10
Bessemer,Ala. T2 .....5.10
Birmingham C15 .....5.10
Buffalo(27) R2 .....5.10
Conshohocken,Pa. A3 ...5.15
Detroit M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 .....5.825
Gary,Ind. U5 .....5.10
Ind.Harbor,Ind. I-2, Y1.5.10
Johnstown,Pa.(25) B2 ..5.10
Lackaw'na,N.Y.(25) B2.5.10
LosAngeles(25) B3 ....5.85
LosAngeles C1 .....5.60
Minnequa,Colo. C10 ....6.20
Riverdale,Ill. A1 .....5.10
SanFrancisco S7 .....6.60
Seattle (25) B3 .....6.10
Seattle N14 .....6.60
Sharon,Pa. S3 .....5.10
S.Chicago W14 .....5.10
S.SanFrancisco(25) B3..5.85
SparrowsPoint,Md. B2 ..5.10
Torrance,Calif. C11 ....5.85
Warren,O. R2 .....5.10
Weirton,W.Va. W6 .....5.10
Youngstown U5 .....5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18 .....8.40
Farrell,Pa. S3 .....8.40
Gary,Ind. U5 .....8.40
Houston S5 .....8.65
Ind.Harbor,Ind. Y1 ....8.40
KansasCity,Mo. S5 .....8.65
LosAngeles B3 .....9.60
Lowellville,O. S3 .....8.40
Newport,Ky. A2 .....8.40
Sharon,Pa. A2, S3 .....8.40
S.Chicago,Ill. W14 .....8.40
Youngstown U5, Y1 .....8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland,Ky. A10 .....7.575
Bessemer,Ala. T2 .....7.575
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.575
Fairfield,Ala. T2 .....7.575
Farrell,Pa. S3 .....7.575
Gary,Ind. U5 .....7.575
Ind.Harbor,Ind. I-2,Y1.7.575
Lackawanna,N.Y. B2 ..7.575
LosAngeles(25) B3 ....8.325
Seattle(25) B3 .....8.575
Sharon,Pa. S3 .....7.575
S.Chicago,Ill. W14 .....7.575
S.SanFrancisco(25) B3.8.325
SparrowsPoint,Md. B2..7.575
Warren,O. R2 .....7.575
Weirton,W.Va. W6 .....7.575
Youngstown U5, Y1....7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ...5.35
Warren,O. R2 .....5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 .....7.425
Baltimore T6 .....7.425
Boston T6 .....7.975
Buffalo S40 .....7.425
Cleveland A7, J5 .....7.425
Dearborn,Mich. S3 ....7.425
Detroit D2, M1, P20 ..7.425
Dover,O. G6 .....7.425
Evanston,Ill. M22 .....7.525
Farrell,Pa. S3 .....7.425
Follansbee,W.Va. F4 ..7.425
Fontana,Calif. K1 .....9.20
FranklinPark,Ill. T6 ..7.525
Ind.Harbor,Ind. Y1 ....7.425
Indianapolis S41 .....7.575
LosAngeles C1, S41 ....9.30
McKeesport,Pa. E10 ...7.525
NewBedford,Mass. R10.7.875
NewBritain,Conn. S15..7.875
NewCastle,Pa. B4, E5..7.425
NewHaven,Conn. D2 ..7.875
NewKensington,Pa. A6.7.425
Pawtucket,R.I. R3 ....7.975
Pawtucket,R.I. N8 ....7.975
Philadelphia P24 .....7.575
Pittsburgh J5 .....7.425
Riverdale,Ill. A1 .....7.525
Rome,N.Y.(32) R6 ....7.425
Sharon,Pa. S3 .....7.425
Trenton,N.J.(31) R5 ...8.875
Wallingford,Conn. W2..7.875
Warren O. R2, T5 .....7.425
Worcester Mass. A7 ...7.975
Youngstown S41, Y1 ...7.425

STRIP, Cold-Rolled Alloy

Boston T6 .....15.90
Carnegie,Pa. S18 .....15.55
Cleveland A7 .....15.55
Dover,O. G6 .....15.55
Farrell,Pa. S3 .....15.55
FranklinPark,Ill. T6 ..15.55
Harrison,N.J. C18 .....15.55
Indianapolis S41 .....15.70
LosAngeles S41 .....17.75
Lowellville,O. S3 .....15.55
Pawtucket,R.I. N8 ....15.90
Riverdale,Ill. A1 .....15.55
Sharon,Pa. S3 .....15.55
Worcester,Mass. A7 ...15.85
Youngstown S41 .....15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7 .....10.80
Dearborn,Mich. S3 ....10.80
Dover,O. G6 .....10.80
Farrell,Pa. S3 .....10.80
Ind.Harbor,Ind. Y1 ....10.80
Sharon,Pa. S3 .....10.80
Warren,O. R2 .....10.80

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	...	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	8.95	10.40	12.60	15.60	....
Farrell,Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	...	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, E5	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	8.95	10.40	12.60	15.60	....
New York W3	...	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y.(32) R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	...	10.70	12.90	15.90	18.85
Wallingford,Conn. W2	9.40	10.70	12.90	15.90	18.75
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol, Conn. W1	18.85	22.95	27.80
Buffalo W12	18.85	....	....
Fostoria,O. S1	19.05	22.15	....
FranklinPark,Ill. T6	19.20	23.30	28.15
Harrison,N.J. C18	18.85	22.95	27.80
New York W3	18.85	22.95	27.80
Palmer,Mass. W12	18.85	....	....
Trenton,N.J. R5	18.85	22.95	27.80
Worcester,Mass. A7, T6	18.85	22.95	27.80
Youngstown S41	19.20	23.30	28.15

Weirton,W.Va. W6 ....10.80
Youngstown Y1 .....10.80

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....8.175

STRIP, C.R. Electrogalvanized

Cleveland A7 .....7.425*
Dover,O. G6 .....7.425*
Evanston,Ill. M22 ....7.525*
McKeesport,Pa. E10 ...7.50*
Riverdale,Ill. A1 .....7.525*
Warren,O. B9, S3, T5.7.425*
Worcester,Mass. A7 ...7.975
Youngstown S41 .....7.425*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Farrell,Pa. S3 .....7.50
Sharon,Pa. S3 .....7.50

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.65
Farrell,Pa. S3 .....5.525
Riverdale,Ill. A1 .....5.675
Sharon,Pa. S3 .....5.525
Youngstown U5 .....5.525

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$9.10	$9.35	$9.75
Fairfield,Ala. T2	9.20	9.45	9.85
Fairless,Pa. U5	9.20	9.45	9.85
Fontana,Calif. K1	9.75	10.00	10.40
Gary,Ind. U5	9.10	9.35	9.75
GraniteCity,Ill. G4	9.20	9.45	9.60
IndianaHarbor,Ind. I-2, Y1	9.10	9.35	9.75
Irvin,Pa. U5	9.10	9.35	9.75
Niles,O. R2	9.10	9.35	9.75
Pittsburg,Calif. C11	9.75	10.00	10.40
SparrowsPoint,Md. B2	9.10	9.35	9.75
Yorkville,O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (20-27 Ga.; Dollars per 100 lb)

Aliquippa,Pa. J5	7.90	8.10	...
Niles,O. R2	7.90	8.10	8.30

TIN PLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$10.40	$10.65
Fairfield,Ala. T2	10.50	10.75
Fairless,Pa. U5	10.50	10.75
Fontana,Calif. K1	11.05	11.30
Gary,Ind. U5	10.40	10.65
Ind.Harb. Y1	10.40	10.65
Pitts.,Calif. C11	11.05	11.30
Sp.Pt.,Md. B2	10.40	10.65
Weirton,W.Va. W6	10.40	10.65
Yorkville,O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$8.20
Fairfield,Ala. T2	8.30
Fairless,Pa. U5	8.30
Fontana,Calif. K1	8.85
Gary,Ind. U5	8.20
GraniteCity,Ill. G4	8.30
Ind.Harbor,Ind. I-2, Y1	8.20
Irvin,Pa. U5	8.20
Niles,O. R2	8.20
Pittsburg,Calif. C11	8.85
SparrowsPoint,Md. B2	8.25
Weirton,W.Va. W6	8.20
Yorkville,O. W10	8.20

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa,Pa. J5	7.85
Gary,Ind. U5	7.85
GraniteCity,Ill. G4	7.95
Ind.Harbor,Ind. Y1	7.85
Irvin,Pa. U5	7.85
Yorkville,O. W10	7.85

MANUFACTURING TERNES (Special Coated, Base Box)

Gary,Ind. U5	$10.05
Irvin,Pa. U5	10.05

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.70	12.40	13.55	14.65
Brackenridge,Pa. A4	....	....	12.40	13.55	14.65
GraniteCity,Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor,Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield,O. E6	9.875*	11.70	12.40	13.55	14.65
Newport,Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles,O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift,Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren,O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville,O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Vandergrift,Pa. U5	8.10
Mansfield,O. E6	8.10

SHEETS (22 Ga., coils & cut lengths) Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.70	16.30	16.80	17.85
Vandergrift,Pa. U5	15.70	16.30	16.80	17.85
Zanesville,O. A10	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler,Pa. A10	....	....	19.70	20.20	20.70	....
Vandergrift,Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren,O. R2	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ..8.00
Aliquippa,Pa. J5 .....8.00
Alton,Ill. L1 .....8.20
Atlanta A1 .....8.00
Bartonville,Ill. K4 .....8.10
Buffalo W12 .....8.00
Chicago W13 .....8.00
Cleveland A7, C20 .....8.00
Crawfordsville,Ind. M8 ..8.10
Donora,Pa. A7 .....8.00
Duluth A7 .....8.00
Fairfield,Ala. T2 .....8.00
Fostoria,O.(24) S1 .....8.10
Houston S5 .....8.25
Jacksonville,Fla. M8 ....8.35
Johnstown,Pa. B2 .....8.00
Joliet,Ill. A7 .....8.00
KansasCity,Mo. S5 .....8.25
Kokomo,Ind. C16 .....8.10
LosAngeles B3 .....8.95
Minnequa,Colo. C10 ....8.25
Monessen,Pa. P7, P16 ..8.00
N.Tonawanda,N.Y. B11 .8.00
Palmer,Mass. W12 .....8.30
Pittsburg,Calif. C11 ....8.95
Portsmouth,O. P12 .....8.00
Rankin,Pa. A7 .....8.00
S.Chicago,Ill. R2 .....8.00
S.SanFrancisco C10 ....8.95
SparrowsPoint,Md. B2 ..8.10
Sterling,Ill.(1) N15 ....8.00
Sterling,Ill. N15 .....8.10
Struthers,O. Y1 .....8.00
Waukegan,Ill. A7 .....8.00
Worcester,Mass. A7 ....8.30

WIRE, Cold Heading Carbon

Elyria,O. W8 .....8.00

WIRE, Gal'd., for ACSR

Bartonville,Ill. K4 .....12.65
Buffalo W12 .....13.40
Cleveland A7 .....12.65
Donora,Pa. A7 .....12.65
Duluth A7 .....12.65
Johnstown,Pa. B2 .....13.40
Minnequa,Colo. C10 ...12.775
Monessen,Pa. P7, P16..12.65
Muncie,Ind. I-7 .....13.60
NewHaven,Conn. A7 ...12.95
Palmer,Mass. W12 ....13.70
Pittsburg,Calif. C11 ...13.45
Portsmouth,O. P12 ....12.65
Roebling,N.J. R5 .....12.95
SparrowsPt.,Md. B2 ...13.50
Struthers,O. Y1 .....13.40
Trenton,N.J. A7 .....12.95
Waukegan,Ill. A7 .....12.65
Worcester,Mass. A7 ...12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....9.75
Alton,Ill. L1 .....9.95
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora,Pa. A7 .....9.75
Duluth A7 .....9.75
Johnstown,Pa. B2 .....9.75
KansasCity,Mo. S5 ....10.00
LosAngeles B3 .....10.70
Minnequa,Colo. C10 ....9.95
Monessen,Pa. P7, P16 ..9.75
NewHaven,Conn. A7 ...10.05
Palmer,Mass. W2 .....10.05
Pittsburg,Calif. C11 ...10.70
Portsmouth,O. P12 .....9.75
Roebling,N.J. R5 .....10.05
S.Chicago,Ill. R2 .....9.75
S.SanFrancisco C10 ....10.70
SparrowsPt.,Md. B2 ....9.85
Struthers,O. Y1 .....9.75
Trenton,N.J. A7 .....10.05
Waukegan,Ill. A7 .....9.75
Worcester,Mass. A7, J4, T6 10.05

WIRE, Mb Spring, High-Carbon

Aliquippa,Pa. J5 .....9.75
Alton,Ill. L1 .....9.95
Bartonville,Ill. K4 .....9.85
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora,Pa. A7 .....9.75
Duluth A7 .....9.75
Fostoria,O. S1 .....9.80
Johnstown,Pa. B2 .....9.75
KansasCity,Mo. S5 ....10.00
LosAngeles B3 .....10.70
Milbury,Mass.(12) N6 .10.05
Minnequa,Colo. C10 ....9.95
Monessen,Pa. P7, P16 ..9.75
Muncie,Ind. I-7 .....9.95
Palmer,Mass. W12 ....10.05
Pittsburg,Calif. C11 ...10.70
Portsmouth,O. P12 .....9.75
Roebling,N.J. R5 .....10.05
S.Chicago,Ill. R2 .....9.75
S.SanFrancisco C10 ....10.70
SparrowsPt.,Md. B2 ....9.85
Struthers,O. Y1 .....9.75
Trenton,N.J. A7 .....10.05
Waukegan,Ill. A7 .....9.75
Wor'ster,Mass. A7, J4, T6 10.05

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1 .....16.50
Bartonville,Ill. K4 ....16.40
Chicago W13 .....16.30
Cleveland A7 .....16.30
Crawfordsville,Ind. M8.16.40
Fostoria,O. S1 .....16.30
Houston S5 .....16.55
Jacksonville,Fla. M8 ...16.65
Johnstown,Pa. B2 .....16.30
KansasCity,Mo. S5 .....16.55
Kokomo,Ind. C16 .....16.30
Minnequa,Colo. C10 ....16.55
Monessen,Pa. P16 .....16.30
Muncie,Ind. I-7 .....16.50
Palmer,Mass. W12 .....16.60
S.SanFrancisco C10 ....17.15
Waukegan,Ill. A7 .....16.30
Worcester,Mass. A7, J6.16.60

WIRE, Tire Bead

Bartonville,Ill. K4 ....17.15
Monessen,Pa. P16 .....17.15
Roebling,N.J. R5 .....17.65

ROPE WIRE	(A)
Bartonville,Ill. K4	13.45
Buffalo W12	13.45
Fostoria,O S1	13.45
Johnstown,Pa. B2	13.45
Monessen,Pa. P7	13.45
Muncie,Ind. I-7	13.65
Palmer,Mass. W12	13.75
Portsmouth,O. P12	13.45
Roebling,N.J. R5	13.75
St.Louis L8	13.45
SparrowsPt.,Md. B2	13.55
Struthers,O Y1	13.45
Worcester,Mass. J4	13.75

(A) Plow and Mild Plow; add 0.25c for Improved Plow

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Farrell,Pa. S3	11.65
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	11.95
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7,T6	12.65

NAILS, Stock

	Col.
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	175
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill. (7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	$10.30

NAILS, Cut (100 lb keg) To Dealers (33)

Wheeling,W.Va. W10	$9.80

POLISHED STAPLES

	Col.
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	177
Bartonville,Ill. K4	177
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	175
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	180
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill. (7) N15	175
Worcester,Mass. A7	181

TIE WIRE, Automatic Baler (14½ Ga.) (per 97 lb Net Box) Coil No. 3150

AlabamaCity,Ala. R2	$10.26
Atlanta A11	10.36
Bartonville,Ill. K4	10.36
Buffalo W12	10.26
Chicago W13	10.26
Crawfordsville,Ind. M8	10.36
Donora,Pa. A7	10.26
Duluth A7	10.26
Fairfield,Ala. T2	10.26
Houston S5	10.51
Jacksonville,Fla. M8	10.36
Johnstown,Pa. B2	10.26
Joliet,Ill. A7	10.26
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	10.36
LosAngeles B3	11.05
Minnequa,Colo. C10	10.51
Pittsburg,Calif. C11	11.04
S.Chicago,Ill. R2	10.26
S.SanFrancisco C10	11.04
SparrowsPt.,Md. B2	10.26
Sterling,Ill. (37) N15	10.36

Coil No. 6500 Stand

AlabamaCity,Ala. R2	$10.60
Atlanta A11	10.70
Bartonville,Ill. K4	10.70
Buffalo W12	10.60
Chicago W13	10.60
Crawfordsville,Ind. M8	10.70
Donora,Pa. A7	10.60
Duluth A7	10.60
Fairfield,Ala. T2	10.60
Houston S5	10.85
Jacksonville,Fla. M8	10.70
Johnstown,Pa. B2	10.60
Joliet,Ill. A7	10.60
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	10.70
LosAngeles B3	11.40
Minnequa,Colo. C10	10.85
Pittsburg,Calif. C11	11.40
S.Chicago,Ill. R2	10.60
S.SanFrancisco C10	11.40
SparrowsPt.,Md. B2	10.70
Sterling,Ill. (37) N15	10.70

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$10.65
Atlanta A11	10.75
Bartonville,Ill. K4	10.75
Buffalo W12	10.65
Chicago W13	10.65
Crawfordsville,Ind. M8	10.75
Donora,Pa. A7	10.65
Duluth A7	10.65
Fairfield,Ala. T2	10.65
Houston S5	10.90
Jacksonville,Fla. M8	10.75
Johnstown,Pa. B2	10.65
Joliet,Ill. A7	10.65
KansasCity,Mo. S5	10.90
Kokomo,Ind. C16	10.75
LosAngeles B3	11.45
Minnequa,Colo. C10	10.90
Pittsburg,Calif. C11	11.45
S.Chicago,Ill. R2	10.65
S.SanFrancisco C10	11.45
SparrowsPt.,Md. B2	10.75
Sterling,Ill. (37) N15	10.75

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	214
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif. C11	236
S.SanFrancisco C10	236
SparrowsPt.,Md. B2	214
Sterling,Ill. (7) N15	214

FENCE POSTS

Birmingham C15	177
ChicagoHts.,Ill. C2, I-2	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Sterling,Ill.(1) N15	177
Tonawanda,N.Y. B12	177

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	.193**
Aliquippa,Pa. J5	.190§
Atlanta A11	.198§
Bartonville,Ill. K4	.198
Crawfordsville,Ind. M8	.198
Donora,Pa. A7	.193†
Duluth A7	.193†
Fairfield,Ala. T2	.193†
Houston S5	.198**
Jacksonville,Fla. M8	.198
Johnstown,Pa. B2	.196§
Joliet,Ill. A7	.193†
KansasCity,Mo. S5	.198**
Kokomo,Ind. C16	.195†
Minnequa,Colo. C10	.198**
Monessen,Pa. P7	.196§
Pittsburg,Calif. C11	.213†
Rankin,Pa. A7	.193†
S.Chicago,Ill. R2	.193**
S.SanFrancisco C10	.213*
SparrowsPoint,Md. B2	.198§
Sterling,Ill.(7) N15	.198††

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-11½ga.J5	190§
Atlanta A11	192§
Bartonville,Ill. K4	192
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(43) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A7	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192††

WIRE (16 gage)

	An'ld Stone	Galv. Stone
Ala.City,Ala. R2	17.85	19.40**
Aliq'ppa,Pa. J5	17.85	19.65
Bartonville K4	17.95	19.75
Cleveland A7	17.85	....
Craw'dsville M8	17.95	19.80‡‡
Fostoria,O. S1	18.35	19.90†
Houston S5	18.10	19.65**
Jacksonville M8	17.95	19.80‡‡
Johnstown B2	17.85	19.65§
Kan.City,Mo. S5	18.10	....
Kokomo C16	17.25	18.80†
Minnequa C10	18.10	19.65**
P'lm'r,Mass.W12	18.15	19.70†
Pitts.,Calif. C11	18.20	19.75†
S.SanFran. C10	18.20	19.75**
Sterling(37)N15	17.25	19.05††
SparrowsPt. B2	17.95	19.75§
Waukegan A7	17.85	19.40†
Worcester A7	18.15	....

WIRE, Merchant Quality (6 to 8 gage)

	An'ld	Galv.
Ala.City,Ala. R2	9.00	9.55**
Aliquippa J5	8.65	9.35§
Atlanta(48) A11	9.10	9.775§
Bartonville(48) K4	9.10	9.775
Buffalo W12	9.00	9.55†
Cleveland A7	9.00	....
Crawfordsville M8	9.10	9.80‡‡
Donora,Pa. A7	9.00	9.55†
Duluth A7	9.00	9.55†
Fairfield T2	9.00	9.55†
Houston(48) S5	9.25	9.80**
Jack'ville,Fla. M8	9.10	9.80‡‡
Johnstown B2(48)	9.00	9.675§
Joliet,Ill. A7	9.00	9.55†
Kans.City(48) S5	9.25	9.80**
Kokomo(48) S16	9.10	9.65†
LosAngeles B3	9.95	10.625§
Monessen(48) P7	8.65	9.35§
Palmer,Mass. W12	9.30	9.85†
Pitts.,Calif. C11	9.95	10.50†
Rankin,Pa. A7	9.00	9.55†
S.Chicago R2	9.00	9.55**
S.SanFran. C10	9.95	10.50**
Spar'wsPt.(48)B2	9.10	9.775§
Sterling(48) N15	9.25	9.925††
St'ling(1)(48)N15	9.15	9.525††
Struthers,O. Y1	9.00	9.65‡
Worcester,Mass.A7	9.30	9.85†

Based on zinc price of: *13.50. †5c. §10c. ‡Less than 10c. ††10.50c. ‡‡11.00c. **Subject to zinc equalization extras.

FASTENERS

(Base discounts, shipments of one to four containers, per cent off list, f.o.b. mill)

BOLTS

Machine Bolts

Full Size Body (cut thread)

½ in. and smaller	
3 in. and shorter	55.0
3¼ in. thru 6 in.	50.0
Longer than 6 in.	37.0
⅝ in., 3 in. & shorter	47.0
3¼ in. thru 6 in.	40.0
Longer than 6 in.	31.0
¾ in. thru 1 in.:	
6 in. and shorter	37.0
Longer than 6 in.	31.0
1⅛ in. and larger:	
All lengths	31.0

Undersize Body (rolled thread)

½ in. and smaller:	
3 in. and shorter	55.0
3¼ in. thru 6 in.	50.0

Carriage Bolts

Full Size Body (cut thread) & Undersize Body (rolled thread)

½ in. and smaller:	
6 in. and shorter	48.0
Larger diameters and longer lengths	35.0

Lag, Plow, Tap, Blank, Step, Elevator, Tire, and Fitting Up Bolts

½ in. and smaller:	
6 in. and shorter	48.0
Larger diameters and longer lengths	35.0

High Tensile Structural Bolts

(Reg. semifinished hex head bolts, heavy semifinished hex nuts. Bolts — High-carbon steel, heat treated. Spec. ASTM A-325, in bulk. Full keg quantity)

⅝ in. diam.	50.0
¾ in. diam.	47.0
⅞ and 1 in. diam.	43.0
1⅛ and 1¼ in. diam.	34.0

NUTS

(Keg or case quantity and over)

Square Nuts, Reg. & Heavy:

All sizes	56.0

(Full container)

Hex Nuts, Reg. & Heavy

Hot Pressed & Cold Punched:

¾ in. and smaller	62.0
⅞ in. to 1½ in., incl.	56.0
1⅝ in. and larger	51.5

Hex Nuts, Semifinished, Heavy (Incl. Slotted):

¾ in. and smaller	62.0
⅞ in. to 1½ in., incl.	56.0
1⅝ in. and larger	51.5

Hex Nuts, Finished (Incl. Slotted and Castellated):

⅞ in. and smaller	65.0
1 in. to 1½ in., incl.	57.0
1⅝ in. and larger	51.5

Semifinished Hex Nuts, Reg. (Incl. Slotted):

⅝ in. and smaller	62.0
¾ in. to ⅞ in., incl.	65.0
1 in. to 1½ in., incl.	57.0
1⅝ in. and larger	51.5

CAP AND SETSCREWS

(Base discounts, packages, per cent off list, f.o.b. mill)

Hex Head Cap Screws, Coarse or Fine Thread, Bright:

6 in. and shorter:

⅝ in. and smaller	35.0
¾, ⅞, and 1 in.	16.0
Longer than 6 in.:	
⅝ in. and smaller	3.0
¾, ⅞, and 1 in.	+11.0

High Carbon, Heat Treated:

6 in. and shorter:

⅝ in. and smaller	20.0
¾, ⅞, and 1 in.	+ 5.0
Longer than 6 in.:	
⅝ in. and smaller	+19.0
¾, ⅞, and 1 in.	+39.0

Flat Head Cap Screws:

¾ in. and smaller, 6 in. and shorter	+85.0

Setscrews, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam.:

6 in. and shorter	+ 5.0
Longer than 6 in.	+29.0

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in., larger 12.85

7/16 in. and smaller by 6 in. and shorter: 15.0%.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.13
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	53.17	40.26
2½	12	49.24	57.72	43.70
2½	12	54.23	63.57	48.13
2¾	12	58.73	68.83	52.13
3	12	62.62	73.40	55.59

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.65	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.50
Johnstown,Pa. B2	....	....	....	(16)6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	6.875

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh P14	14.75
Seattle B3	15.85

SCREW SPIKES

Lebanon,Pa. B2	15.10

STANDARD TRACK SPIKES

Fairfield,Ala. T2	9.75
Ind.Harbor,Ind. I-2,Y1.	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(21) New Haven, Conn., base.
(22) Dedd. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Dedd. in mill zone, 6.295c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; dedd. in mill zone or within switching limits, 5.635c.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds; 9.65c, over 3½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	1.5	+27	+10.5	+36	+21	+45.5	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+7.75
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	0.5	+28	+11.5	+37	+22	+45.5	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.72		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.25	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on current price of zinc (11.50c, East St. Lou's).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling—Ingot	Rerolling—Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	28.00	....	36.00	....	43.50	39.25	48.50	45.00
202	24.75	31.50	37.75	39.00	42.25	44.50	40.00	49.25	49.25
301	24.00	29.00	38.75	37.25	43.50	46.00	41.25	51.25	47.50
302	26.25	32.75	39.50	40.50	44.25	46.75	42.25	52.00	52.00
302B	26.50	34.00	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	34.50	42.00	43.75	47.00	49.50	45.75	55.00	55.00
304L	....	....	49.75	51.50	54.75	57.25	53.50	62.75	62.75
305	29.50	38.25	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	39.75	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	51.25	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	63.75	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	51.25	64.50	68.50	71.75	75.75	71.75	80.75	80.75
316L	....	....	72.25	76.25	79.50	83.50	79.50	88.50	88.50
317	49.75	62.25	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	41.50	48.75	53.50	54.50	57.50	54.75	65.50	65.50
330	....	....	123.25	....	113.00	143.75	135.00	149.25	149.25
18-8 CbTa	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	29.25	....	33.25	35.00	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	22.25	29.25	31.00	33.25	35.00	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	34.75	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	22.50	29.75	32.00	33.75	35.50	31.00	40.75	40.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	51.75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary, Allegheny Ludlum Steel Corp.; Washington Steel Corp.

Clad Steel

	Plates—5% Carbon Base	Plates—10% Carbon Base	Plates—15% Carbon Base	Plates—20% Carbon Base	Sheets—20% Carbon Base
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	48.90	59.55	70.15	80.85	....
Nickel	41.65	51.95	63.30	72.70	....
Nickel, Low Carbon	41.95	52.60	63.30	74.15	....
Monel	43.35	53.55	63.80	74.05	....

	Strip, Carbon Base—Cold Rolled—10%	Strip, Carbon Base—Cold Rolled—Both Sides
Copper*	35.55	42.05

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4, and Washington, Pa. J3, nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	W-Cr Hot Work (H-12)	0.530
Spec. Carbon (W-1)	0.385	V-Cr Hot Work (H-13)	0.550
Oil Hardening (O-1)	0.505	W Hot Wk. (H-21)	1.425-1.44
V-Cr Hot Work (H-11)	0.505	Hi-Carbon-Cr (D-11)	0.955

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	....	T-1	1.840
18	4	2	....	....	T-2	2.005
13.5	4	3	....	....	T-3	2.105
18.25	4.25	1	4.75	....	T-4	2.545
18	4	2	9	....	T-5	2.915
20.25	4.25	1.6	12.95	....	T-6	4.330
13.75	3.75	2	5	....	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
Birmingham R2	62.00	62.50**	....	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.50*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago, Ill. R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	69.02	69.52	69.52	70.02
Muskegon, Mich., deld.	....	74.52	74.52	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	68.00	68.50	69.00	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
NewYork, deld.	....	75.50	76.00	....
Newark, N.J., deld.	72.69	73.19	73.69	74.19
Philadelphia, deld.	70.41	70.91	71.41	71.99
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Pittsburgh District				
NevilleIsland, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKeesRocks, Pa., deld.	....	67.60	67.60	68.13
Lawrenceville, Homestead, Wilmerding, Monaca, Pa., deld.	....	68.26	68.26	68.79
Verona, Trafford, Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge, Pa., deld.	68.60	69.10	69.10	69.63
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....
Mansfield, Ohio, deld.	71.30	....	71.80	72.30
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Everett, Mass. E1	67.50	68.00	68.50	....
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
GraniteCity, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	....	62.50‡	66.50	....
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson, Ohio I-3, J1	$78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity, Ky. P15	$99.00
NiagaraFalls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry, $9 freight allowed K2	103.50
Keokuk, Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, max fr'gt allowed up to $9, K2	106.50

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles, Tenn. T3 (Phos. 0.035% max)	$73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Troy, N.Y. R2 (Phos. 0.035% max)	73.00
Philadelphia, deld.	81.67
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
NevilleIsland, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00

Steel Service Center Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Denver, Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Birmingham, Chattanooga, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Galv. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.‡	H.R. Alloy 4140††[5]		Carbon	Floor
Atlanta	8.59§	9.86§	10.13	....	8.91	9.39	13.24 #	....	9.40	9.29	11.21
Baltimore	8.55	9.25	9.99	....	9.05	9.45	11.85 #	15.48	9.55	9.00	10.50
Birmingham	8.18	9.45	10.46	....	8.51	8.99	....	....	9.00	8.89	10.90
Boston	9.31	10.40	11.97	53.50	9.73	10.11	13.39 #	15.71	10.01	10.02	11.85
Buffalo	8.40	9.60	10.85	55.98	8.75	9.15	11.45 #	15.40	9.25	9.20	10.75
Chattanooga	8.35	9.69	9.65	....	8.40	8.77	10.46	....	8.88	8.80	10.66
Chicago	8.25	9.45	10.50	53.00	8.51	8.99	9.15	15.05	9.00	8.89	10.20
Cincinnati	8.43	9.51	10.95	53.43	8.83	9.31	11.53 #	15.37	9.56	9.27	10.53
Cleveland	8.36	9.54	10.65	52.33	8.63	9.10	11.25 #	15.16	9.39	9.13	10.44
Dallas	8.80	9.30	....	....	8.85	8.80	....	....	8.75	9.15	10.40
Denver	9.40	11.84	12.94	....	9.43	9.80	11.19	....	9.84	9.76	11.08
Detroit	8.51	9.71	11.25	56.50	8.88	9.30	9.51	15.33	9.56	9.26	10.46
Erie, Pa.	8.35	9.45	9.95[10]	....	8.60	9.10	11.25	....	9.35	9.10	10.60
Houston	8.40	8.90	10.29	52.00	8.45	8.40	11.60	15.75	8.35	8.75	10.10
Jackson, Miss.	8.52	9.79	....	....	8.84	9.82	10.68	....	9.33	9.22	11.03
Los Angeles	8.70[2]	10.80[2]	12.15[2]	57.60	9.15	9.10[2]	12.95[2]	16.35	9.00[2]	9.10[2]	11.30[2]
Memphis, Tenn.	8.59	9.80	....	....	8.84	9.32	11.25 #	....	9.33	9.22	10.86
Milwaukee	8.39	9.59	11.04	....	8.65	9.13	9.39	15.19	9.22	9.03	10.34
Moline, Ill.	8.55	9.80	....	....	8.84	8.95	9.15	....	8.99	8.91	....
New York	8.87	10.13	11.10	53.08	9.64	9.99	13.25 #	15.50	9.74	9.77	11.05
Norfolk, Va.	8.40	....	....	....	9.10	9.10	12.00	....	9.40	8.85	10.35
Philadelphia	8.20	9.25	11.34	52.71	9.25	9.40	11.95 #	15.48	9.10	9.15	10.40**
Pittsburgh	8.35	9.55	10.90	52.00	8.61	8.99	11.25 #	15.05	9.00	8.89	10.20
Richmond, Va.	8.40	....	10.40	....	9.10	9.00	....	....	9.40	8.85	10.35
St. Louis	8.63	9.83	11.28	....	8.89	9.37	9.78	15.43	9.48	9.27	10.58
St. Paul	8.79	10.04	11.49	....	8.84	9.21	9.86	....	9.38	9.30	10.49
San Francisco	9.65	11.10	11.40	55.10	9.75	10.15	13.00	16.00	9.85	10.00	12.35
Seattle	10.30	11.55	12.50	56.52	10.25	10.50	14.70	16.80[2]	10.20	10.10	12.50
South'ton, Conn.	9.07	10.33	10.71	....	9.48	9.74	....	....	9.57	9.57	10.91
Spokane	10.35	11.55	12.55	57.38	10.80	11.05	14.70	16.80	10.25	10.15	13.05
Washington	9.15	....	....	....	9.65	10.05	12.50	....	10.15	9.60	11.10

*Prices do not include gage extras; †prices include gage and coating extras; ‡includes 35-cent bar quality extras; §42 in. and under; **½ in. and heavier; ††as annealed; ‡‡⅝ in. to 4 in. wide, inclusive; #net price, 1 in. round C-1018.

Base quantities, 2000 to 4999 lb except as noted; cold-finished bars, 2000 lb and over except in Seattle, 2000 to 3999 lb; stainless sheets, 8000 lb except in Chicago, New York, Boston, Seattle, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb, except in Seattle, 30,000 lb and over; [2]—30,000 lb; [3]—1000 to 4999 lb; [5]—1000 to 1999 lb; [10]—2000 lb and over.

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchens, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., $140; Salina, Pa., $145; Niles, Ohio, $138; Cutler, Utah, $165.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $233.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Lehigh, Utah, $175; Los Angeles, $180.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $157; Morrisville, Hays, Latrobe, Pa., $168; E. Chicago, Ind., $167; Curtner, Calif., $182.

Semisilica Brick (per 1000)

Clearfield, Pa., $140; Philadelphia, $145; Woodbridge, N. J., $135.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa., Portsmouth, Ohio, $102.

High-Alumina Brick (per 1000)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $235; Danville, Ill., $253; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $295; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $335; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $188.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Nario, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.60.

Magnesite (per net ton)

Domestic, dead-burned, ⅛ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅝ in. grains with fines: Baltimore, $73.

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $25; barge, Brownsville, Tex., $27.

Ores

Lake Superior Iron Ore

(Prices effective for the 1958 shipping season, gross ton, 51.50% iron natural rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 30, 1957, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, foundry and basic 62-64% concentrates	18.00-19.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	23.00
N. African hematite (spot)	nom
Brazilian iron ore, 68.5%	26.00

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$12.25-$12.50*
Domestic, concentrates f.o.b. milling points	16.00-17.00†

*Before duty. †Nominal.

Manganese Ore

Mn 46-48%, Indian (export tax included) $1.10 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; other than Indian, nominal; contracts by negotiation.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$42.00-44.00
48% 2.8:1	38.00-40.00
48% no ratio	29.00-31.00

South African Transvaal

44% no ratio	22.00-23.00
48% no ratio	29.00-31.00

Turkish

48% 3:1	51.00-55.00

Domestic

Rail nearest seller

18% 3:1	39.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked	$1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

50-55%	$2.25-2.40
60-65%	2.50-3.10

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, Swedish:	
98% Fe:	
F.o.b. Camden or Riverton, N. J., freight allowed east of Mississippi river, ocean bags, 23,000 lb and over	11.25
Sponge Iron, Domestic, 98% Fe:	
Deld. east of Mississippi River 23,000 lb and over	11.25
100 mesh	9.10
40 mesh	8.10
Electrolytic Iron, Melting stock, 99.87% Fe, irregular fragments of ⅛ in. x 1.3 in.	28.75
(In contract lots of 240 tons price is 22.75c)	
Annealed, 99.5% Fe	36.50
Unannealed (99 + % Fe)	36.00
Unannealed (99 + % Fe) (minus 325 mesh)	59.00
Powder Flakes (minus 16, plus 100 mesh)	29.00
Carbonyl Iron:	
98.1-99.9%, 3 to 20 microne, depending on grade, 93.00-290.00 in standard 200-lb containers; all minus 200 mesh	
Aluminum:	
Atomized, 500-lb drum, freight allowed Carlots	38.50
Ton lots	40.50
Antimony, 500-lb lots	42.00*
Brass, 5000-lb lots	33.00-48.90†
Bronze, 5000-lb lots	49.60-53.70†
Copper:	
Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese:	
Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed	74.00
Nickel-Silver, 5000-lb lots	50.99-55.40†
Phosphor-Copper, 5000-lb lots	61.80
Copper (atomized) 5000-lb lots	42.30-50.80†
Silicon	47.50
Solder	7.00*
Stainless Steel, 304	$1.07
Stainless Steel, 316	$1.26
Tin	14.00*
Zinc, 5000-lb lots	19.00-32.20‡
Tungsten: Dollars	
Melting grade, 99% 60 to 200 mesh, nominal:	
1000 lb and over	3.15
Less than 1000 lb	3.30
Chromium, electrolytic 99.8% Cr, min metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam	Inches Length	Per 100 lb
2	24	$64.00
2½	30	41.50
3	40	39.25
4	40	37.00
5¼	40	36.50
6	60	33.25
7	60	29.75
8, 9, 10	60	29.50
12	72	28.25
14	60	28.25
16	72	27.25
17	60	27.25
18	72	27.00
20	72	26.50
24	84	27.25

CARBON

8	60	14.25
10	60	13.80
12	60	14.75
14	60	14.75
14	72	12.55
17	60	12.65
17	72	12.10
20	90	11.55
24	72, 84	11.95
24	96	12.10
30	84	12.00
35, 40	110	11.60
40	100	12.50

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.25
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry Coke

Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Detroit, ovens	32.00
Pontiac, Mich., deld.	33.95
Saginaw, Mich., deld.	35.53
Erie, Pa., ovens	32.00
Everett, Mass., ovens:	
New England, deld.	33.55*
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	31.00
Cincinnati, deld.	32.84
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.19
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.73
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

*Or within $5.15 freight zone from works.

Imported Steel

(Base per 100 lb, landed, duty paid, based on current ocean rates. Any increase in these rates is for buyer's account. Source of shipment: Western continental European countries.)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$5.10	$5.10	$5.00	$5.45
Bar Size Angles	5.00	5.00	4.90	5.33
Structural Angles	5.00	5.00	4.90	5.33
I-Beams	5.06	5.06	4.96	5.40
Channels	5.06	5.06	4.96	5.40
Plates (basic bessemer)	6.62	6.62	6.62	6.94
Sheets, H.R.	8.20	8.20	8.20	8.50
Sheets, C.R. (drawing quality)	8.75	8.75	8.75	9.12
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	25.71	25.50	25.50	26.48
Barbed Wire (†)	6.60	6.60	6.60	6.95
Merchant Bars	5.40	5.40	5.35	5.90
Hot-Rolled Bands	7.15	7.15	7.15	7.55
Wire Rods, Thomas Commercial No. 5	5.15	5.28	5.10	5.45
Wire Rods, O.H. Cold Heading Quality No. 5	6.05	6.18	6.00	6.30
Bright Common Wire Nails (‡)	7.89	7.75	7.67	8.26

†Per 82 lb net reel. ‡Per 100-lb kegs, 20d nails and heavier.

Coal Chemicals

(Representative prices)

Cents per gal., f.o.b. tank cars or tank trucks, plant

Pure benzene	31.00
Xylene, industrial grade	29.00
Creosote	22.00
Naphthalene, 78 deg	7.00
Toluene, one deg. (del. east of Rockies)	25.00
Cents per lb, f.o.b. tank cars or tank trucks, del.	
Phenol, 90 per cent grade	15.50
Per net ton bulk, f.o.b. cars or trucks, plant	
Ammonium sulfate, regular grade	$42.00

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Neville Island, Pa. 21-23% Mn, $105; 19-21% Mn, 1-3% Si, $102.50; 16-19% Mn, $100.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $245, Johnstown, Duquesne, Sheriden, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively. (Mn 79-81%). Lump $253 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.03% C, 3.5c for max 0.5% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 25.5c per lb of contained Mn, packed, carload 26.8c, ton lot 28.4c, less ton 29.6c. Delivered. Spot,add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2%). Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lot 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, bulk, 33.25c; 2000 lb to min carload, 36c; less ton, 38c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload ,lump, bulk 1.50% C grade, 18-20% Si, 12.8c per lb of alloy. Packed, c.l. 14c, ton 14.45c, less ton 15.45c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb, $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $240 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $245.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $290 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $295.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l. lump, bulk 28.75c per lb of contained Cr; c.l. packed 30.30c, ton lot 32.05c; less ton 33.45c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: Cr 63-66% (Simplex), carload, lump, bulk, C 0.025% max, 36.75c per lb contained Cr; 0.010% max, 37.75c. Ton lot, add 3.5c; less ton, add 5.2c. Delivered.

Cr 67-71%, carload, lump, bulk, C 0.02% max, 41.00c per lb contained Cr; 0.025% max, 39.75c; 0.05% max, 39.00c; 0.10% max, 38.50c; 0.20% max, 38.25c; 0.50% max, 38.00c; 1.0% max, 37.75c; 1.5% max, 37.50c; 2.0% max, 37.25c. Ton lot, add 3.4c; less ton lot, add 5.1c. Delivered.

Foundry Ferrochrome, High-Carbon: (Cr 61-66%, C 5-7%, Si 7-10%). Contract, c.l., 2 in. x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload packed, SM x D, 21.25c per lb of alloy, ton lot 22.50c; less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr. 39-41%, Si 42-45%, C 0.05% max or Cr 33-36%, Si 45-48%, C 0.05% max. Carload, lump, bulk, 3" down and 2" x down, 28.25c per lb contained Cr, 14.60c per lb contained Si, 0.75" x down 29.40c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade, (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed 2" x D plate (about ½" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2 % max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1 $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract less carload lot, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Contract, carload, lump, bulk, 14.6c per lb of contained Si. Packed c.l. 17.1c, ton lot 18.55c, less ton 20.20c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c, ton lot 20.45c, less ton 21.7c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 20c per lb of contained Si. Packed c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.07% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing min 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lot, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 27.25c per lb of alloy, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4 % B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Contract, lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%) Contract, carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3¾ lb each and containing 2 lb of Cr). Contract, carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Contract, carload, bulk 14.8c per lb of briquet; c.l., packed, bags 16c; 3000 lb to c.l., pallets 16c; 2000 lb to c.l., bags 17.2c; less ton 18.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). Contract, c.l. bulk 15.1c per lb of briquet; c.l. packed, bags 16.3c, 3000 lb to c.l., pallets 16.3c; 2000 lb to c.l., bags 17.5c; less ton 18.4c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Contract, carload, bulk 8c per lb of briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l., bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.49 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb, f.o.b. Niagara Falls, N. Y.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $2.15 per lb (nominal) of contained W. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Ton lots 2" x D, $4 per lb of contained Cb; less ton lots $4.05 (nominal). Delivered.

Ferrotantalum Columbium: (Cb 40% approx, Ta 20% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.80 per lb of contained Cb plus Ta, delivered; less ton lots $3.85 (nominal).

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Contract, c.l. packed ½-in. x 12 M 20.00c per lb of alloy, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 20c per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk 19.25c. Packed c.l. 20.25c, 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $120 per gross ton.

Ferromolybdenum: (55-75%). Per lb of contained Mo, in 200-lb container, f.o.b. Langeloth and Washington, Pa. $1.76 in all sizes except powdered which is $1.82.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans, $1.47; in bags, $1.46, f.o.b. Langeloth and Washington, Pa.

Scrap Advances Despite Slow Buying

STEEL's composite on No. 1 heavy melting advances for the second straight week, rising another 34 cents to $40.67. Mill interest limited though ingot operations climb

Scrap Prices, Page 112

Pittsburgh—Trading is slow, but the market remains firm. Prime grades are up $1 on the basis of a broker's purchase for a mill on the edge of the district. Dealers are encouraged by reports that steel consumers are starting to build inventories.

Chicago—Scrap appears headed into another listless period, with prices essentially unchanged. Demand is not improving to the extent steelmaking operations are rising. The Chicago area has eight idle blast furnaces, and any appreciable price rise on the important steelmaking grades of scrap would tend to increase use of hot metal in preference to scrap in meeting melting needs.

Philadelphia—The market shows signs of strength, but there have been no price changes over the past week. One major market interest predicts higher prices by weekend. Export business is described as "vigorous."

New York—New strength is reported in the local market. Export business is expected to swing up this week. The rising optimism in the market is reflected in higher broker buying prices.

Boston—Prices on No. 1 heavy melting, No. 1 bundles, and No. 1 busheling are up $2 a ton. The higher quotations are based on moderate buying for eastern Pennsylvania delivery.

Cleveland — Rising steelmaking operations here and in the Valley are lending a measure of strength in the scrap market. The Cleveland district ingot rate last week advanced 1½ points to 85 per cent of capacity, while the Valley rate advanced 1 point to 65 per cent. Dealers are confident that further rise in operations will soon necessitate substantial mill buying of scrap.

Buffalo—Rising steel production is prompting scrapmen to view the market more optimistically, though the steelmakers have not entered the market for substantial tonnage.

Cincinnati—Prices are unchanged; brokers are filling out their first-of-the-month orders. February buying may bring another price advance, possibly of $1 to $2 a ton.

St. Louis — The market is firm, and prices appear to be headed upward. Mills and foundries are increasing their orders, and bad weather is retarding collecting and processing. The movement of tonnage to the mills is slimmer.

Birmingham — Some consumers filled their January needs early in the month and have been out of the market since. Others, particularly foundries, are buying limited quantities.

Houston—Brokers' buying prices are unchanged. Texas mill demand for February shipment tonnage is limited, but a major Mexican mill has contracted for moderate tonnages of No. 1 and No. 2 heavy melting steel to be shipped to it through March. It paid $40 for the No. 1 steel and $37 for the No. 2, delivered the border. At Eagle Pass, Tex., brokers' buying prices for a Mexican mill have been reduced to $28 for No. 1 steel, $26 for No. 2, and $20 for No. 2 bundles.

San Francisco—The local market is inactive, and prices are unchanged. Leading area steelmakers are quoting $32-$34 on No. 1 heavy melting, $30-$32 on No. 2 heavy melting, and $30-$32 for No. 1 bundles.

Los Angeles—Some scrap tonnages are moving to Japan from

(Please turn to Page 117)

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"Angular" Grit
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Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including brokers' commission, as reported to STEEL, Jan. 21, 1959. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Jan. 21	$40.67
Jan. 14	40.33
Dec. Avg.	39.47
Jan. 1958	34.10
Jan. 1954	29.05

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*43.00-44.00*
No. 2 heavy melting	35.00-36.00
No. 1 dealer bundles	44.00-45.00
No. 2 bundles	31.00-32.00
No. 1 busheling	*43.00-44.00*
No. 1 factory bundles	48.00-49.00
Machine shop turnings	20.00-21.00
Mixed borings, turnings	20.00-21.00
Short shovel turnings	*25.00-26.00*
Cast iron borings	*25.00-26.00*
Cut structurals:	
2 ft and under	49.00-50.00
3 ft lengths	48.00-49.00
Heavy turnings	*35.00-36.00*
Punchings & plate scrap	49.00-50.00
Electric furnace bundles	49.00-50.00

Cast Iron Grades

No. 1 cupola	44.00-45.00
Stove plate	41.00-42.00
Unstripped motor blocks	31.00-32.00
Clean auto cast	39.00-40.00
Drop broken machinery	51.00-52.00

Railroad Scrap

No. 1 R.R. heavy melt.	46.00-47.00
Rails, 2 ft and under	56.00-57.00
Rails, 18 in. and under	57.00-58.00
Random rails	54.00-55.00
Railroad specialties	50.00-51.00
Angles, splice bars	50.00-51.00
Rails, rerolling	58.00-59.00

Stainless Steel Scrap

18-8 bundles & solids	225.00-230.00
18-8 turnings	125.00-130.00
430 bundles & solids	125.00-130.00
430 bundles	55.00-65.00

CHICAGO

No. 1 hvy melt, indus.	43.00-44.00
No. 1 heavy melt, dealer	41.00-42.00
No. 2 heavy melting	36.00-37.00
No. 1 factory bundles	46.00-47.00
No. 1 dealer bundles	43.00-44.00
No. 2 bundles	*30.00-31.00*
No. 1 busheling, indus.	43.00-44.00
No. 1 busheling, dealer	41.00-42.00
Machine shop turnings	21.00-22.00
Mixed borings, turnings	23.00-24.00
Short shovel turnings	23.00-24.00
Cast iron borings	23.00-24.00
Cut structurals, 3 ft	48.00-49.00
Punchings & plate scrap	49.00-50.00

Cast Iron Grades

No. 1 cupola	*47.00-48.00*
Stove plate	44.00-45.00
Unstripped motor blocks	38.00-39.00
Clean auto cast	*55.00-56.00*
Drop broken machinery	*55.00-56.00*

Railroad Scrap

No. 1 R.R. heavy melt.	45.00-46.00
R.R. malleable	57.00-58.00
Rails, 2 ft and under	58.00-59.00
Rails, 18 in. and under	59.00-60.00
Angles, splice bars	54.00-55.00
Axles	69.00-70.00
Rails, rerolling	62.00-63.00

Stainless Steel Scrap

18-8 bundles & solids	215.00-220.00
18-8 turnings	115.00-120.00
430 bundles & solids	115.00-120.00
430 turnings	45.00-50.00

YOUNGSTOWN

No. 1 heavy melting	43.00-44.00
No. 2 heavy melting	29.00-30.00
No. 1 busheling	43.00-44.00
No. 1 bundles	43.00-44.00
No. 2 bundles	29.00-30.00
Machine shop turnings	15.00-16.00
Short shovel turnings	20.00-21.00
Cast iron borings	20.00-21.00
Low phos.	43.00-44.00
Electric furnace bundles	43.00-44.00

Railroad Scrap

No. 1 R.R. heavy melt.	44.00-45.00

CLEVELAND

No. 1 heavy melting	*40.00-41.00*
No. 2 heavy melting	25.00-26.00
No. 1 factory bundles	43.00-44.00
No. 1 bundles	*40.00-41.00*
No. 2 bundles	28.50-29.50
No. 1 busheling	*40.00-41.00*
Machine shop turnings	14.00-15.00
Short shovel turnings	20.00-21.00
Mixed borings, turnings	20.00-21.00
Cast iron borings	20.00-21.00
Cut foundry steel	39.00-40.00
Cut structurals, plates 2 ft and under	*48.00-49.00*
Low phos, punchings & plate	*41.00-42.00*
Alloy free, short shovel turnings	22.00-23.00
Electric furnace bundles	*40.00-41.00*

Cast Iron Grades

No. 1 cupola	*45.00-46.00*
Charging box cast	37.00-38.00
Heavy breakable cast	*37.00-38.00*
Stove plate	43.00-44.00
Unstripped motor blocks	*33.00-34.00*
Brake shoes	36.00-37.00
Clean auto cast	49.00-50.00
Burnt cast	33.00-34.00
Drop broken machinery	*50.00-51.00*

Railroad Scrap

R.R. malleable	63.00-64.00
Rails, 2 ft and under	57.00-58.00
Rails, 18 in. and under	58.00-59.00
Rails, random lengths	52.00-53.00
Cast steel	49.00-50.00
Railroad specialties	50.00-51.00
Uncut tires	43.00-44.00
Angles, splice bars	50.00-51.00
Rails, rerolling	56.00-57.00

Stainless Steel
(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	205.00-215.00
18-8 turnings	115.00-120.00
430 clips, bundles, solids	110.00-120.00
430 turnings	40.00-50.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	37.00
No. 2 heavy melting	35.00
No. 1 bundles	39.00
No. 2 bundles	*28.00*
No. 1 busheling	39.00
Machine shop turnings	*19.00†*
Short shovel turnings	*21.00†*

Cast Iron Grades

No. 1 cupola	48.00
Charging box cast	40.00
Heavy breakable cast	38.00
Unstripped motor blocks	39.00
Clean auto cast	48.00
Stove plate	44.00

Railroad Scrap

No. 1 R.R. heavy melt.	*45.50*
Rails, 18 in. and under	52.00†
Rails, random lengths	*47.50*
Rails, rerolling	*58.00*
Angles, splice bars	47.00

BIRMINGHAM

No. 1 heavy melting	33.00-34.00
No. 2 heavy melting	27.00-28.00
No. 1 bundles	33.00-34.00
No. 2 bundles	21.00-22.00
No. 1 busheling	33.00-34.00
Cast iron borings	14.00-15.00
Machine shop turnings	21.00-22.00
Short shovel turnings	22.00-23.00
Bars, crops and plates	42.00-43.00
Structurals & plates	41.00-42.00
Electric furnace bundles	37.00-38.00
Electric furnace:	
2 ft and under	35.00-36.00
3 ft and under	34.00-35.00

Cast Iron Grades

No. 1 cupola	53.00-54.00
Stove plate	53.00-54.00
Charging box cast	29.00-30.00
Unstripped motor blocks	40.00-41.00
No. 1 wheels	41.00-42.00

Railroad Scrap

No. 1 R.R. heavy melt.	38.00-39.00
Rails, 18 in. and under	47.00-48.00
Rails, rerolling	56.00-57.00
Rails, random lengths	42.00-43.00
Angles, splice bars	42.00-43.00

PHILADELPHIA

No. 1 heavy melting	36.00
No. 2 heavy melting	33.00
No. 1 bundles	37.00
No. 2 bundles	23.50-24.50
No. 1 busheling	36.00
Electric furnace bundles	38.00-39.00
Mixed borings, turnings	18.00†
Short shovel turnings	22.00
Machine shop turnings	19.00
Heavy turnings	30.00
Structurals & plate	41.00-42.00
Couplers, springs, wheels	44.00
Rail crops, 2 ft & under	57.00-58.00

Cast Iron Grades

No. 1 cupola	39.00
Heavy breakable cast	41.00
Malleable	62.00
Drop broken machinery	48.00-49.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*28.00-29.00*
No. 2 heavy melting	*25.00-26.00*
No. 1 bundles	*28.00-29.00*
No. 2 bundles	*17.00-18.00*
Machine shop turnings	*10.00-11.00*
Mixed borings, turnings	*13.00-14.00*
Short shovel turnings	*14.00-15.00*
Low phos. (structurals & plates)	*34.00-35.00*

Cast Iron Grades

No. 1 cupola	*35.00-36.00*
Unstripped motor blocks	*23.00-24.00*
Heavy breakable	32.00-33.00

Stainless Steel

18-8 sheets, clips, solids	185.00-190.00
18-8 borings, turnings	85.00-90.00
410 sheets, clips, solids	55.00-60.00
430 sheets, clips, solids	75.00-80.00

BUFFALO

No. 1 heavy melting	35.00-36.00
No. 2 heavy melting	29.00-30.00
No. 1 bundles	35.00-36.00
No. 2 bundles	25.00-26.00
No. 1 busheling	35.00-36.00
Mixed borings, turnings	17.00-18.00
Machine shop turnings	15.00-16.00
Short shovel turnings	19.00-20.00
Cast iron borings	17.00-18.00
Low phos. structurals and plate, 2 ft and under	42.00-43.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	43.00-44.00
No. 1 machinery	47.00-48.00

Railroad Scrap

Rails, random lengths	47.00-48.00
Rails, 3 ft and under	53.00-54.00
Railroad specialties	42.00-43.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	38.00-39.00
No. 2 heavy melting	33.00-34.00
No. 1 bundles	38.00-39.00
No. 2 bundles	25.00-26.00
No. 1 busheling	38.00-39.00
Machine shop turnings	19.00-20.00
Mixed borings, turnings	20.00-21.00
Short shovel turnings	22.00-23.00
Cast iron borings	19.00-20.00
Low phos, 18 in.	46.00-47.00

Cast Iron Grades

No. 1 cupola	45.00-46.00
Heavy breakable cast	39.00-40.00
Charging box cast	38.00-39.00
Drop broken machinery	47.00-48.00

Railroad Scrap

No. 1 R.R. heavy melt.	43.00-44.00
Rails, 18 in. and under	55.00-56.00
Rails, random lengths	49.00-50.00

HOUSTON

(Brokers' buying prices; f.o.b. cars)

No. 1 heavy melting	33.00
No. 2 heavy melting	30.00
No. 1 bundles	33.00
No. 2 bundles	23.00†
Machine shop turnings	17.00
Short shovel turnings	20.00
Low phos. plates & structurals	39.00†

Cast Iron Grades

No. 1 cupola	42.00
Heavy breakable	27.00-28.00†
Foundry malleable	37.00
Unstripped motor blocks	33.00

Railroad Scrap

No. 1 R.R. heavy melt.	33.00†

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*27.00-28.00*
No. 2 heavy melting	20.00-21.00
No. 1 bundles	*27.00-28.00*
No. 1 busheling	*27.00-28.00*
Machine shop turnings	*8.00-9.00*
Short shovel turnings	*11.00-12.00*
No. 1 cast	33.00
Mixed cupola cast	33.00
No. 1 machinery cast	34.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	35.00-36.00
No. 2 heavy melting	22.50-23.50
No. 1 bundles	36.00-37.00
No. 2 bundles	24.00-25.00
No. 1 busheling	35.00-36.00
Machine shop turnings	13.00-14.00
Mixed borings, turnings	13.00-14.00
Short shovel turnings	14.00-15.00

Cast Iron Grades

No. 1 cupola	44.00-45.00
Stove plate	33.00-34.00
Charging box cast	33.00-34.00
Heavy breakable	35.00-36.00
Unstripped motor blocks	22.00-23.00
Clean auto cast	47.00-48.00

SEATTLE

No. 1 heavy melting	31.00
No. 2 heavy melting	29.00
No. 1 bundles	29.00
No. 2 bundles	23.00
Machine shop turnings	9.00-10.00†
Mixed borings, turnings	9.00-10.00†
Electric furnace No. 1	38.00†

Cast Iron Grades

No. 1 cupola	31.00†
Heavy breakable cast	28.00†
Unstripped motor blocks	23.00†
Stove plate (f.o.b. plant)	21.00†

LOS ANGELES

No. 1 heavy melting	36.00
No. 2 heavy melting	34.00
No. 1 bundles	33.00
No. 2 bundles	18.00
Machine shop turnings	15.00
Shoveling turnings	18.00
Cast iron borings	15.00
Cut structurals and plate 1 ft and under	47.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	47.00

Railroad Scrap

No. 1 R.R. heavy melt.	38.00

SAN FRANCISCO

No. 1 heavy melting	32.00-34.00
No. 2 heavy melting	30.00-32.00
No. 1 bundles	30.00-32.00
No. 2 bundles	22.00
Machine shop turnings	15.00
Mixed borings, turnings	15.00
Cast iron borings	15.00
Heavy turnings	15.00
Short shovel turnings	15.00
Cut structurals, 3 ft	40.00

Cast Iron Grades

No. 1 cupola	44.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	40.00
No. 1 wheels	34.00

HAMILTON, ONT.

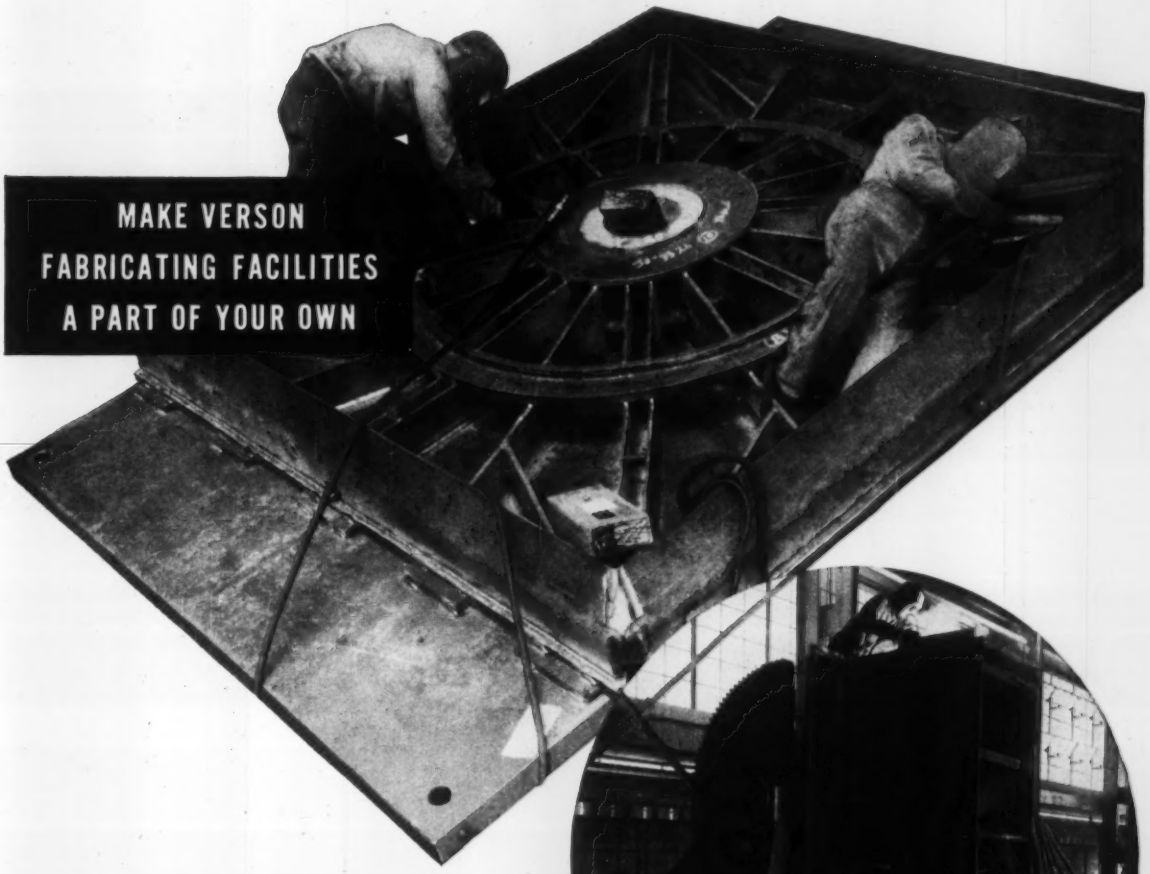
(Brokers' buying prices)

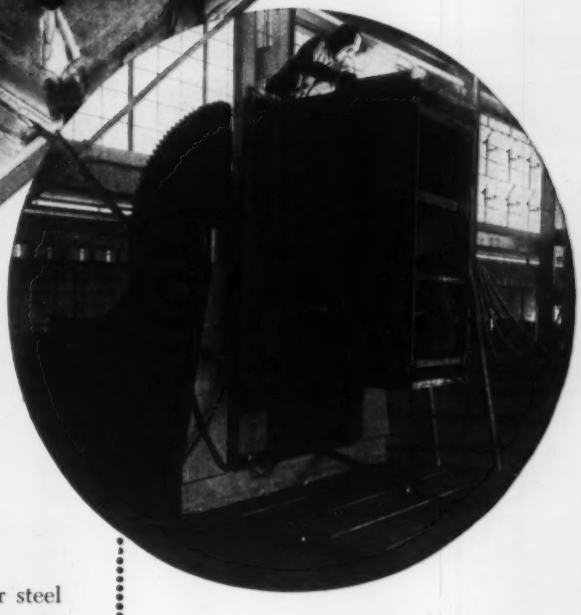
No. 1 heavy melting	34.50
No. 2 heavy melting	30.50
No. 1 bundles	34.50
No. 2 bundles	25.00
Mixed steel scrap	26.50
Mixed borings, turnings	15.00
Busheling, new factory:	
Prepared	34.50
Unprepared	28.50
Short steel turnings	19.00

Cast Iron Grades‡

No. 1 machinery cast	39.00-41.00

†Nominal.
‡F.o.b. Hamilton, Ont.





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Molybdenum Breaks Through

Bureau of Mines' success in casting the metal could open up wide new markets, but a lot of research will be needed before the process becomes practical for metalworking

Nonferrous Metal Prices, Pages 116 & 117

THE U. S. Bureau of Mines has cast molybdenum for the first time, but it doesn't mean the process will soon be available to industry. As one observer put it: "Casting would be a boon, but right now no one is sure if it will be practical."

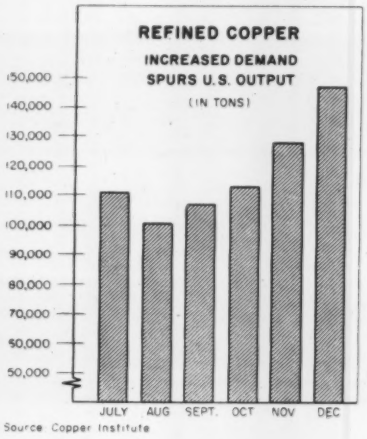
• **Lower Cost** — The cost saving potential is the obvious advantage. Most products are now forged or extruded, entailing expensive machining operations. Metallurgists also believe castings would give a much higher rate of metal recovery. (It runs about 75 per cent for extrusions and forgings.) Both factors would tend to offset the metal's high cost ($10 a pound and up), so it would be competitive with nickel-bearing alloys.

For years molybdenum was thought of as a specialty metal, and uses were pretty much wedded to the electronics and electrical fields. Over the last few years, uses have penetrated into the steel industry, atomic energy, and chemical processing. With the advent of the Space Age, the metal found a niche in the missile field—forged valves and a few extruded nozzles in solid fuel rockets.

• **Potential**—The Bureau of Mines says intricate molybdenum castings "would advance the development of missiles, rockets, and satellites, giving the missile engineer greater flexibility of design and a cheaper way to construct vital components." Besides defense applications, cast metal would open up other areas. "There's no reason why you couldn't cast heavy cylinders for use as extrusion stock," says a government metallurgist.

Industry observers cite such potential markets as chemical pump components and liquid metal valves and piping for atomic energy installations. It might even be possible to spin large pipe, remarks one metalman.

• **The Gimmick**—The metal's advantages now lie in its corrosion resistance, strength at high temperatures, high melting point (key factor in missile use), good electrical properties, and high stiffness.



Source: Copper Institute

Before castings graduate from the research stage, metallurgists will have to define their physical properties.

• **Summing Up**—The metal seems to be on the march. Consumption was 834,000 lb in 1956, 868,000 lb in 1957, and an estimated 1.7 million lb last year. Demand in 1959 will largely hinge on what direction the missile program takes.

Silver Gains Seen in '59

U. S. silver consumption will rise in 1959, predicts Handy & Harman, New York. The metal didn't fare so well last year. U. S. usage dropped 10 per cent to 85 million ounces. Free World consumption dipped 13 per cent to 250.5 million ounces. Usage breakdown: Arts and industries, 187.4 million ounces; coinage, 63.1 million ounces. At the same time, Free World production saw a slight increase to 204.7 million ounces.

The firm reports that nearly all of the silver outstanding on lend-lease obligations has been returned.

Copper Business Good

There's no boom in copper but business is good. Early estimates are that January's domestic shipments will about match December's total of 116,310 tons.

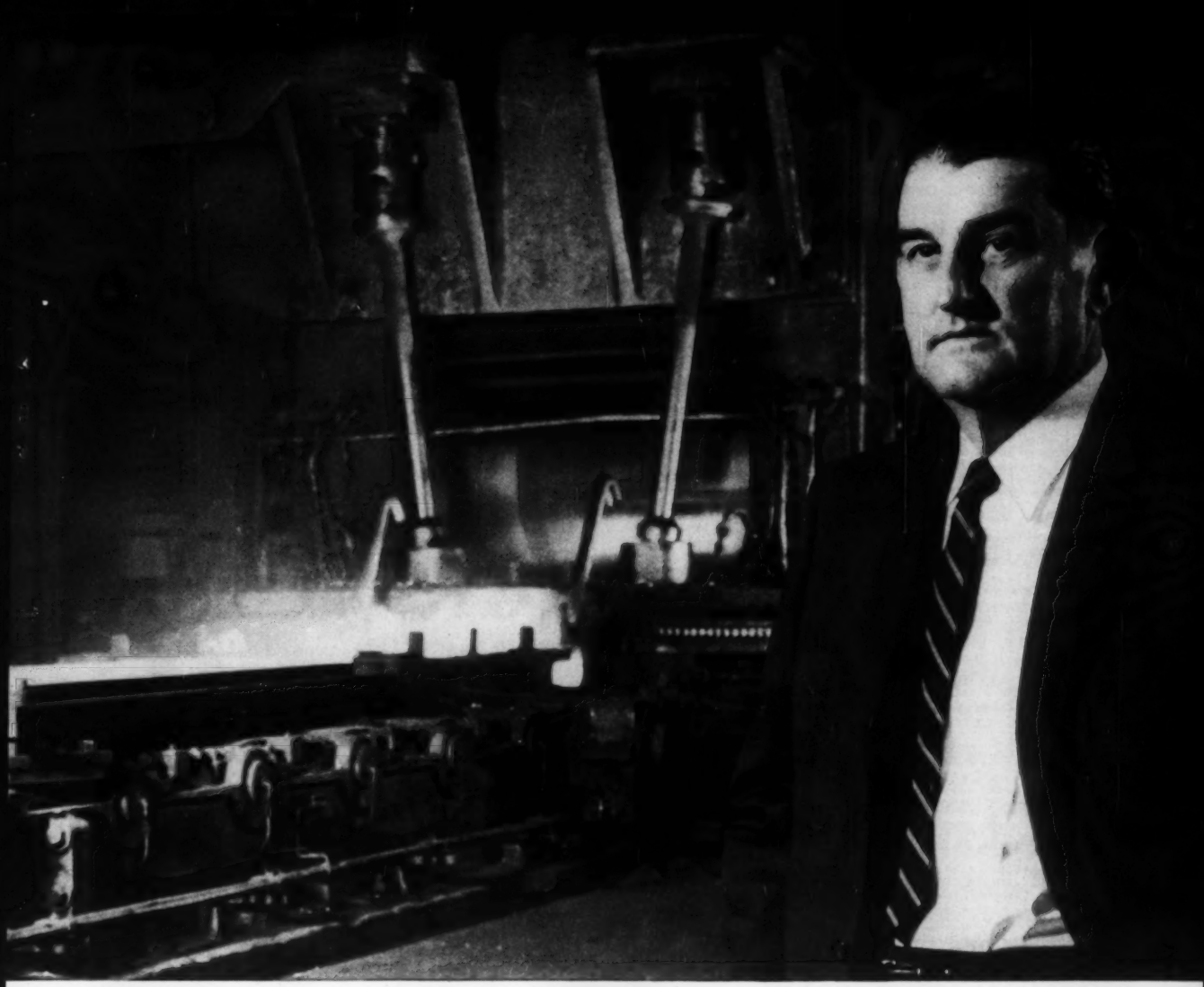
All the ingredients for a price hike are still present: Good demand, a high price overseas, low inventories. (Producers' stocks have shrunk to 80,722 tons, a decline of around 162,000 tons in six months.) One metalman puts it this way: "Either the foreign price will have to come down or the domestic quotation go up."

Custom smelters continue to quote 29.5 cents a pound, 0.5 cent over primary, but sales are only fair at that level. Any movement would probably be down.

NONFERROUS PRICE RECORD

	Price Jan. 21	Last Change	Previous Price	Dec. Avg	Nov. Avg	Jan., 1958 Avg
Aluminum	24.70	Aug. 1, 1958	24.00	24.700	24.700	26.000
Copper	29.00-29.50	Jan. 12, 1959	29.00	28.856	29.415	25.135
Lead	12.80	Oct. 14, 1958	12.30	12.800	12.800	12.800
Magnesium	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	74.000
Tin	99.875	Jan. 20, 1959	99.625	99.019	99.034	92.933
Zinc	11.50	Nov. 7, 1958	11.00	11.500	11.386	10.000

Quotations in cents per pound based on: COPPER, mean of primary and secondary, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary pig, 99.5+%, f.o.b. shipping point; MAGNESIUM, pig, 99.8%, Velasco, Tex.



"Steel roll users like the complete service National gives them"

says Deac Scholl, manager of roll sales

"The new building, new equipment and new processes included in the expansion of National's roll-making facilities have resulted in a more complete line of longer-life steel rolls for our increasing number of steel roll customers.

"The expansion embraces all phases of production from pouring to machining. For instance . . . with the new facilities, including the newest type electric furnaces, we can now pour and machine steel rolls, both plain and grooved, in a wide range of sizes.

"And in addition, we have increased sales and service personnel, so we can give you, as never before, in-plant attention to your roll problems.

"Our staff members have had years of experience in the roll, steel foundry, and other metallurgical fields. They are well aware of the many metallurgical and rolling problems that occur; and recognize that selection of the correct roll—whether iron, nodular iron, or steel—can be of extreme importance.

"Let us study your problem and give you our recommendations for its solution."

GENERAL STEEL CASTINGS CORPORATION

National Roll & Foundry Division

Avonmore (Westmoreland County) Pennsylvania

General Steel Castings Corporation: General Offices, Granite City, Ill.
Plants: Granite City, Ill.—Eddystone, Pa.—Avonmore, Pa.

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 24.70; ingots, 26.80, 30,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 28.60; No. 43, 28.40; No. 195, 29.40; No. 214, 30.20; No. 356, 28.60; 30 or 40 lb ingots.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 24.50-25.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.45 per lb deld.

Cobalt: 97.99%, $2.00 per lb for 550-lb keg; $2.02 per lb for 100 lb case; $2.07 per lb under 100 lb.

Columbium: Powder, $55-85 per lb, nom.

Copper: Electrolytic, 29.00 deld.; custom smelters, 29.50; lake, 29.00 deld.; fire refined, 28.75 deld.

Germanium: First reduction, $179.17-197.31 per lb; intrinsic grade, $197.31-220 per lb, depending on quantity.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $70-80 nom. per troy oz.

Lead: Common, 12.80; chemical, 12.90; corroding, 12.90, St. Louis. New York basis, add 0.20.

Lithium: 98 + %, 50-100 lb, cups or ingots, $12; rod, $15; shot or wire, $16. 100-500 lb, cups or ingots, $10.50; rod, $14; shot or wire, $15, f.o.b. Minneapolis.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex.; 12 in. sticks, 59.00 f.o.b. Madison, Ill.

Magnesium Alloys: AZ91A (diecasting), 40.75 deld.; AZ63A, AZ92A, 9Z91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $218-221 per 76-lb flask.

Molybdenum: Unalloyed, turned extrusion, 3.75-5.75 in. round, $9.60 per lb in lots of 2500 lb or more, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, 74.50; "F" nickel, 5 lb ingots in kegs for addition to cast iron, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter at Buffalo, New York, or other established U. S. points of entry, contained nickel, 69.60.

Osmium: $70-100 per troy oz nom.

Palladium: $15-17 per troy oz.

Platinum: $52-55 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $118-125 per troy oz.

Ruthenium: $45-55 per troy oz.

Selenium: $7.00 per lb, commercial grade.

Silver: Open market, 90.375 per troy oz.

Sodium: 17.00 c.l.; 19.00-19.50 l.c.l.

Tantalum: Rod, $60 per lb; sheet, $55 per lb.

Tellurium: $1.65-1.85 per lb.

Thallium: $7.50 per lb.

Tin: Straits, N. Y. spot, 99.875; prompt, 99.75.

Titanium: Sponge, 99.3 + % grade A-1, ductile (0.3% Fe max.), $1.62-1.82; grade A-2 (0.5% Fe max.), $1.70 per lb.

Tungsten: Powder, 89.8%, carbon reduced, 1000-lb lots, $3.15 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99 + % hydrogen reduced, $3.30-3.80.

Zinc: Prime Western, 11.50; brass special, 11.75; intermediate, 12.00, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 12.50; special high grade, 12.75 deld. Diecasting alloy ingot No. 3, 14.00; No. 2, 14.25; No. 5, 14.50 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $7 per lb; 100-500 lb, $6.50 per lb; over 500 lb, $6 per lb.
(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 23.875-25.25; No. 12 foundry alloy (No. 2 grade), 21.75-22.00; 5% silicon alloy, 0.60 Cu max., 24.75-25.00; 13 alloy 0.60 Cu max., 24.75-25.00; 195 alloy, 25.25-26.00; 108 alloy, 22.25-22.50. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.50; grade 2, 22.00; grade 3, 21.00; grade 4, 19.00.

Brass Ingot: Red brass, No. 115, 28.00; tin bronze, No. 225, 37.50; No. 245, 32.25; high-leaded tin bronze, No. 305, 32.25; No. 1 yellow, No. 405, 23.00; manganese bronze, No. 421, 24.75.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.885, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.865, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 34.35; l.c.l., 34.98. Weatherproof, 20,000-lb lots, 35.54; l.c.l., 36.29.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $18.50 per cwt; pipe, full coils, $18.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $6.90-14.35; sheared mill plate, $5.00-8.50; wire, $5.50-9.50; forging billets, $3.55-4.10; hot-rolled and forged bars, $4.25-5.40.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 26.00; ribbon zinc in coils, 21.50; plates, 20.00.

ZIRCONIUM

Plate, $12.50-19.20; H.R. strip, $12.50-22.90; C.R. strip, $15.90-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	126	106	128
Strip, C.R.	124	108	138
Plate, H.R.	120	105	121
Rod, Shapes, H. R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheets: 1100, 3003 and 5005 mill finish (30,000 lb base; freight allowed).

Thickness Range, Inches	Flat Sheet	Coiled Sheet
0.250-0.136	42.80-47.30	.....
0.136-0.096	43.20-48.30	.....
0.126-0.103	.....	39.20-39.80
0.096-0.077	43.80-50.00	39.30-40.00
0.077-0.068	44.30-52.20	.....
0.077-0.061	.....	39.50-40.70
0.068-0.061	44.30-52.20	.....
0.061-0.048	44.90-54.40	40.10-41.80
0.048-0.038	45.40-57.10	40.60-43.20
0.038-0.030	45.70-62.00	41.00-45.70
0.030-0.024	46.20-53.70	41.30-45.70
0.024-0.019	46.90-56.80	42.40-44.10
0.019-0.017	47.70-54.10	43.00-44.70
0.017-0.015	48.60-55.00	43.80-45.50
0.015-0.014	49.60	44.80-46.50
0.014-0.012	50.80	45.50
0.012-0.011	51.80	46.70
0.011-0.0095	53.50	48.10
0.0095-0.0085	54.60	49.60
0.0085-0.0075	56.20	50.80
0.0075-0.007	57.70	52.30
0.007-0.006	59.30	53.70

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in. 24-60 in. width or diam., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	42.40	47.20
5050-F	43.50	48.30
3004-F	44.50	50.20
5052-F	45.10	50.90
6061-T6	45.60	51.70
2024-T4	49.30	56.10
7075-T6*	57.60	64.70

*24-48 in. width or diam., 72-180 in. lengths

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats*	——Round—— 2011-T3	2017-T4	——Hexagonal—— 2011-T3	2017-T4
0.125	76.90	73.90	....	....
0.250	62.00	60.20	89.10	76.60
0.375	61.20	60.00	73.50	68.50
0.500	61.20	60.00	73.50	68.50
0.625	61.20	60.00	69.80	64.20
0.750	59.70	58.40	63.60	60.40
0.875	59.70	58.40	63.60	60.40
1.000	59.70	58.40	63.60	60.40
1.125	57.30	56.10	61.50	58.30
1.250	57.30	56.10	61.50	58.30
1.350	57.30	56.10	61.50	58.30
1.500	57.30	56.10	61.50	58.30
1.625	55.00	53.60	....	56.20
1.750	55.00	53.60	60.30	56.20
1.875	55.00	53.60	....	56.20
2.000	55.00	53.60	60.30	56.20
2.125	53.50	52.10	....	....
2.250	53.50	52.10	....	56.20
2.375	53.50	52.10	....	....
2.500	53.50	52.10	....	56.20
2.625	....	50.40	....	....
2.750	51.90	50.40	....	56.20
2.875	....	50.40	....	....
3.000	51.90	50.40	....	56.20
3.125	....	50.40	....	....
3.250	....	50.40	....	....
3.375	....	50.40	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random lengths, diam. 0.375-8 in., "F" temper; 2014, 42.20-55.00; 6061, 41.60-55.00; 7075, 61.60-75.00; 7070, 66.60-80.00.

Pipe: ASA schedule 40, alloy 6063-T6 standard length, plain ends, 90.000 lb base, dollars per 100 ft. Nominal pipe sizes: ¾ in., 18.85; 1 in., 29.75; 1¼ in., 40.30; 1½ in., 48.15; 2 in., 58.30; 4 in., 160.20; 6 in., 287.55; 8 in., 432.70.

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	42.70-44.20	51.30-55.50
12-14	42.70-44.20	52.00-56.50
15-17	42.70-44.20	53.20-58.20
18-20	43.20-44.70	55.20-60.80

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.10; .25-.75 in., 70.60-71.60. Tooling plate, .25-.30 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.00	85.70-88.00
24-26	75.60-76.30	90.60-91.30
36-38	89.20-90.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots.)
Copper and Brass: No. 1 heavy copper and wire, 22.50-23.00; No. 2 heavy copper and wire, 20.50-21.00; light copper, 18.75-19.25; No. 1 composition red brass, 16.50-17.00; No. 1 com-

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES e (Based on copper at 29.00c)		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	53.13b	50.36c	....	53.39	25.000	25.000	24.250
Yellow Brass	46.57	31.22d	47.11	49.98	17.000	16.750	15.250
Low Brass, 80%	49.23	49.17	48.87	52.54	21.250	21.000	20.500
Red Brass, 85%	50.17	50.11	50.71	53.48	22.125	21.875	21.375
Com. Bronze, 90%	51.65	51.59	52.19	54.71	22.875	22.625	22.125
Manganese Bronze	54.98	48.58	59.08	....	17.750	17.500	16.875
Muntz Metal	49.35	44.66	....	....	17.875	17.625	17.125
Naval Brass	51.24	45.05	57.80	54.65	17.625	17.375	16.875
Silicon Bronze	58.27	57.46	57.81	75.95	24.625	24.625	23.625
Nickel Silver, 10%	62.20	66.60	64.03	....	23.875	23.625	11.937
Phos. Bronze	72.59	73.09	72.59	74.27	25.875	25.625	24.625

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb.

position turnings, 15.50-16.00; new brass clippings, 14.75-15.25; light brass, 11.00-11.50; heavy yellow brass, 12.00-12.50; new brass rod ends, 12.50-13.00; auto radiators, unsweated, 13.00-13.50; cocks and faucets, 13.50-14.00; brass pipe, 13.50-14.00.

Lead: Heavy, 8.25-8.75; battery plates, 4.00-4.25; linotype and stereotype, 10.00-10.50; electrotype, 8.50-9.00; mixed babbitt, 9.50-10.00.

Monel: Clippings, 30.00-31.00; old sheets, 27.00-28.00; turnings, 22.00-23.00; rods, 30.00-31.00.

Nickel: Sheets and clips, 52.00-55.00; rolled anodes, 52.00-55.00; turnings, 37.00-40.00; rod ends, 52.00-55.00.

Zinc: Old zinc, 4.00-4.25; new diecast scrap, 3.75-4.00; old diecast scrap, 2.50-2.75.

Aluminum: Old castings and sheets, 9.75-10.25; clean borings and turnings, 6.25-6.75; segregated low copper clips, 13.00-13.50; segregated high copper clips, 13.00-13.50; mixed low copper clips, 12.00-12.50; mixed high copper clips, 10.75-11.25.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 11.00-11.50; clean borings and turnings, 9.00-9.50; segregated low copper clips, 15.50-16.00; segregated high copper clips, 15.00-15.50; mixed low copper clips, 15.00-15.50; mixed high copper clips, 14.50-15.00.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 10.00-10.50; clean borings and turnings, 9.00-9.50; segregated low copper clips, 14.00-14.50; segregated high copper clips, 12.50-13.00; mixed low copper clips, 13.00-13.50; mixed high copper clips, 12.00-12.50.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 55.00; light scrap, 50.00; turnings and borings, 35.00.

Copper and Brass: No. 1 heavy copper and wire, 25.50; No. 2 heavy copper and wire, 23.875; light copper, 21.625; refinery brass (60% copper) per dry copper content, 22.875.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 25.50; No. 2 heavy copper and wire, 23.875; light copper, 21.625; No. 1 composition borings, 19.50; No. 1 composition solids, 20.00; heavy yellow brass solids, 14.50; yellow brass turnings, 13.50; radiators, 15.50.

PLATING MATERIALS

(F.o.b shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.45.

Copper: Flat-rolled, 46.79; oval, 45.00; 5000-10,000 lb; electrodeposited, 38.50, 2000-5000 lb lots; cast, 41.00, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 118.50; 200-499 lb, 117.00; 500-999 lb, 116.50; 1000 lb or more, 116.00.

Zinc: Balls, 18.00; flat tops, 18.00; flats, 20.75; ovals, 20.00, ton lots.

CHEMICALS

Cadmium Oxide: $1.45 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,900 lb, 61.90.

Copper Sulphate: 100-1900 lb, 14.65; 2000-5900 lb, 12.65; 6000-11,900 lb, 12.40; 12,000-22,900 lb, 12.15; 23,000 lb or more, 11.65.

Nickel Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 5000-9900 lb, 38.00; 10,000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,990 lb, 28.50; 40,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 200 lb, 20.80; 400-800 lb, 19.80; 1000-19,800 lb, 18.80; 20,000 lb or more, 17.80.

Sodium Stannate: Less than 100 lb, 78.50; 100-600 lb, 69.20; 700-1900 lb, 66.40; 2000-9900 lb, 64.60; 10,000 lb or more, 63.30.

Stannous Chloride (Anhydrous): 25 lb, 153.80; 100 lb, 148.90; 400 lb, 146.50; 800-19,900 lb, 105.60; 20,000 lb or more, 99.50.

Stannous Sulphate: Less than 50 lb, 139.00; 50 lb, 109.00; 100-1900 lb, 107.00; 2000 lb or more, 105.00.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(*Concluded from Page 111*)

this port and Long Beach; the market is firm, with prices unchanged at the recently established levels.

Seattle—Sales are few, and prices are nominal. Large consumers hold ample inventories. Local ship breaking operations are fairly active; stocks are being piled against requirements of a more active market.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 109

Prices of oven foundry coke have been increased $1.50 a ton, reflecting recent advances in coal prices. It's the first upward revision in coke in well over a year. (See Page 109 for new prices).

Demand from foundries has improved slightly—producers of automotive castings especially are showing more interest. Supplies are ample at all points.

Pig Iron . . .

Pig Iron Prices, Page 108

Modest improvement is recorded in the merchant iron market. Some foundries are busier, especially those serving the automotive industry. Automakers probably will stockpile some castings during second quarter as a hedge against a steel strike. This could give a strong push to second quarter iron demand.

Merchant iron producers' supplies on hand are sufficient for short term needs. Idle blast furnace capacity can be activated should the demand for pig iron warrant it.

SQUARING SHEAR WANTED

Good used Squaring Shear with hold downs and back gauges. Capacity ⅝ inch or ½ inch by ten feet or 12 feet. Make and model not important.

SHAMRAD BOILER COMPANY, INC.
1001 South 8th Street
St. Joseph, Missouri

MELT SHOP METALLURGIST

For expanding basic steel producer in Chicago. Required are a metallurgical degree or equivalent and five or more years of steelmaking experience involving open hearth practices and procedures. Excellent advancement potential for qualified individual. Liberal employee benefit program. In reply give age, salary requirements, and complete resume of education and work experience. All replies will be considered confidential. Box No. 728, STEEL, Penton Bldg., Cleveland 13, Ohio.

CLASSIFIED

Help Wanted

WANTED: EXPERIENCED ROLLER FOR SMALL BAR mill. Southern location, excellent working conditions. Give resume experience, present employment, salary desired, and availability. Reply Box 729, STEEL, Penton Bldg., Cleveland 13, Ohio.

WE CAN HELP YOU TO CONTACT high calibre men to fill specific jobs you have in mind—

Readers of STEEL include men of wide training and experience in the various branches of the metalworking industry. When you have an opportunity to offer, use the Help Wanted columns of STEEL.

MOTORS • GENERATORS TRANSFORMERS
NEW • REBUILT
ELECTRIC EQUIPMENT CO.
WORLD'S LARGEST INVENTORY
CALL COLLECT GL 3-6783
P. O. BOX 51 • ROCHESTER 1, N. Y.

METALLIZING WIRES
all ferrous and non-ferrous metals
Rigidly Specified for
Metal Spraying
Spra-Rod CORPORATION
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Bearing Headquarters Since 1920
Phone: DAnube 6-6800
2633 S. Michigan Ave. • Chicago 16, Ill.

ROLLING MILL METALLURGIST

For expanding basic steel producer in Chicago. Required are a metallurgical degree or equivalent and five or more years of steelmaking experience involving soaking pit and hot rolling mill practices and procedures. Excellent advancement potential for qualified individual. Liberal employee benefit program. In reply give age, salary requirements, and complete resume of education and work experience. All replies will be considered confidential. Box No. 731, STEEL, Penton Bldg., Cleveland 13, Ohio.

Iron Ore Statistics—November, 1958

(Gross Tons)

STOCKS AT FURNACE YARDS AND DOCKS ON LAST DAY OF THE MONTH

Stocks at	U. S. Ores		Canadian		Foreign	
U. S. Furnaces:	L. Superior	Other	L. Superior	Other	Ores	Totals
Eastern	5,897,398	168,508	243,388	1,806,914	3,999,716	12,115,924
Pitts-Valley	13,258,690	58,411	728,829	3,046,820	4,334,744	21,427,494
Cleve-Detroit	10,605,303	90,745	443,769	389,630	344,516	11,873,963
Chicago	15,149,922	(a)	(a)	.....	(a)	15,149,922
Southern	(a)	2,505,277	.....	(a)	1,917,243	4,422,520
Western	.....	914,521	.....	.....	.....	914,521
Totals	44,911,313	3,737,462	1,415,986	5,243,364	10,596,219	65,904,344
At U. S. Docks:						
Lake Erie	4,166,713	.....	91,193	1,054,176	.....	5,312,082
Other	.....	.....	.....	(a)	(a)	(a)
Totals	4,166,713	.....	91,193	1,054,176	(a)	5,312,082
Total U. S. Stocks	49,078,026	3,737,462	1,507,179	6,297,540	10,596,219	71,216,426
Total Canadian	2,502,339	.....	134,160	602,983	95,206	3,334,688
Total U. S. & Canada	51,580,365	3,737,462	1,641,339	6,900,523	10,691,425	74,551,114

CONSUMPTION OF IRON ORE—NOVEMBER, 1958

(Gross Tons)

In U. S. Districts:	U. S. Ores		Canadian		Foreign	
	L. Superior	Other	L. Superior	Other	Ores	Totals
Eastern	557,961	209,320	30,015	220,983	779,128	1,797,407
Pitts-Valley	1,744,217	125,710	77,536	384,144	517,612	2,849,219
Cleve-Detroit	1,137,944	30,711	120,018	26,137	112,484	1,427,294
Chicago	2,041,929	(a)	(a)	.....	(a)	2,041,929
Southern	(a)	488,026	.....	(a)	155,474	643,500
Western	.....	502,360	.....	.....	.....	502,360
In U. S.						
Blast furnaces	4,324,420	816,495	175,591	347,787	661,651	6,425,944
Steel furnaces	236,060	77,601	8,578	41,668	423,448	787,355
Sintering (1)	921,565	353,316	43,400	241,809	476,679	2,036,769
Miscellaneous (2)	6	8,715	.....	.....	2,920	11,641
Total U. S.	5,482,051	1,356,127	227,569	631,264	1,564,698	9,261,709
In Canada						
Blast furnaces	188,337	.....	74,932	55,201	.....	318,470
Steel furnaces	6,985	.....	.....	4,171	13,135	24,291
Sintering (1)	52,552	.....	12,642	27,959	.....	93,153
Miscellaneous (2)	19	.....	.....	.....	.....	19
Total Canada	247,893	.....	87,574	87,331	13,135	435,933
Total U. S. & Canada	5,729,944	1,356,127	315,143	718,595	1,577,833	9,697,642

1—Ore consumed at sintering plants not located at mine site.
2—Sold to nonreporting companies or used for purposes not listed.
(a)—Small tonnage included in other districts to avoid disclosure.
Data from the American Iron Ore Association and American Iron & Steel Institute.

Made to highest standard and uniform quality thus insuring maximum service.

In Stock
Round, Square, Oblong Punches and Dies, Rivet Sets

Write Dept. A for catalog 60 and new stock list.

GEO. F. MARCHANT COMPANY
1420-34 So. ROCKWELL STREET · CHICAGO 8, ILLINOIS

Structural Shapes . . .

Structural Shape Prices, Page 103

More wide flange and plate girder tonnage is being estimated in New England, mostly for bridges. Vermont contracts alone involve 1680 tons, and a plate girder span over the Merrimac River at Manchester, N. H., is before the market.

The seasonal lag in construction continues to hold back new business. But fabricators are confident a substantial pickup in requirements on public account, roads, schools and other structures will come with better weather. Also, a rise in industrial construction is expected.

"We anticipate 1959 industrial awards to show some improvement over the low level of the last two years," says H. C. Turner Jr., president, Turner Construction Co.

Price competition among fabricators is sharp, notably on composite beam and stringer bridges. They require a minimum of shopwork, and some fabricators are not estimating on this type job.

Structural fence pipe (about 20 per cent lighter than standard pipe) has been added to Jones & Laughlin's product list. Used in the fabrication of fencing, other applications will be sought, including: Railings, struts, material handling equipment, agricultural implements, scaffolding, awning frames, and racks.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

10,000 tons, 40 story office building, 80 Pine St., New York, to Harris Structural Steel Co., New York.

5480 tons, manufacturing building, Western Electric Co., Oklahoma City, Okla., to Robberson Steel Co., Oklahoma City.

2400 tons, gates and stoplogs, powerplant, Lewiston, N. Y., for the New York State Power Authority, New York, to Milwaukee Crane Div., Industrial Enterprises, Milwaukee.

2256 tons, Barrett Station No. 2, Island Park, N. Y., for Long Island Lighting Co. to Lehigh Structural Steel Co., Allentown, Pa.

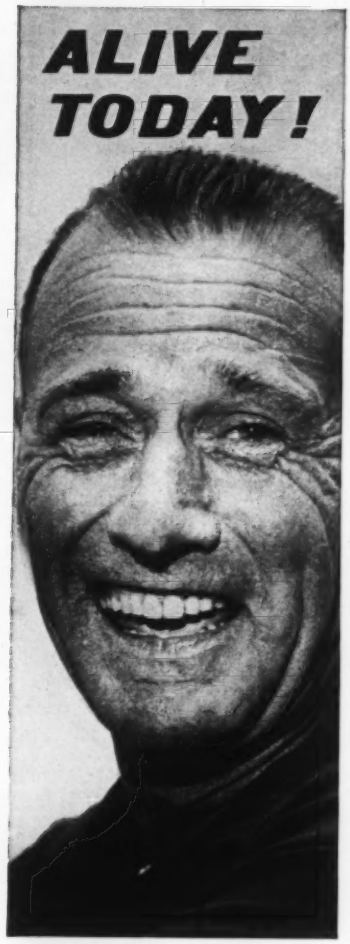
2232 tons, state bridgework, Westchester County, New York, through Poirier & McLane Corp., general contractor, to City Iron Works, Wethersfield, Conn.

1840 tons, Garrard Wynston Memorial, Roosevelt Hospital, 59th St. and 9th Ave., New York, through York & Sawyer, to Schacht Steel Construction Inc., New York.

1680 tons, plate girder bridge, Merrimack River, Manchester-Bedford, N. H., to American Bridge Div., U. S. Steel Corp., Pittsburgh; Monroe & Langstroth Inc., Norwood, Mass., general contractor.

1400 tons, manufacturing plant and boilerhouse, Linden, N. J., through Mahoney-Trost Construction Co., general contractor, to the Keystone Structural Steel Co.

1300 tons, bus garage, New York City Transit Authority, Queens, New York, to Bethlehem Fabricators, Bethlehem, Pa.



Arch Lightbody, like 800,000 other Americans, is cured of cancer. Like 800,000 other Americans he went to his doctor **in time**—in time for early diagnosis and prompt and successful treatment. He learned that many cancers are curable if detected in time.

You can do two things to defeat cancer: Have an annual health checkup. Be alert to the 7 danger signals that could mean cancer:

1. Unusual bleeding or discharge. 2. A lump or thickening in the breast or elsewhere. 3 A sore that does not heal. 4. Change in bowel or bladder habits. 5. Hoarseness or cough. 6. Indigestion or difficulty in swallowing. 7. Change in a wart or mole. If your signal lasts longer than two weeks, go to your doctor to learn if it means cancer.

AMERICAN CANCER SOCIETY

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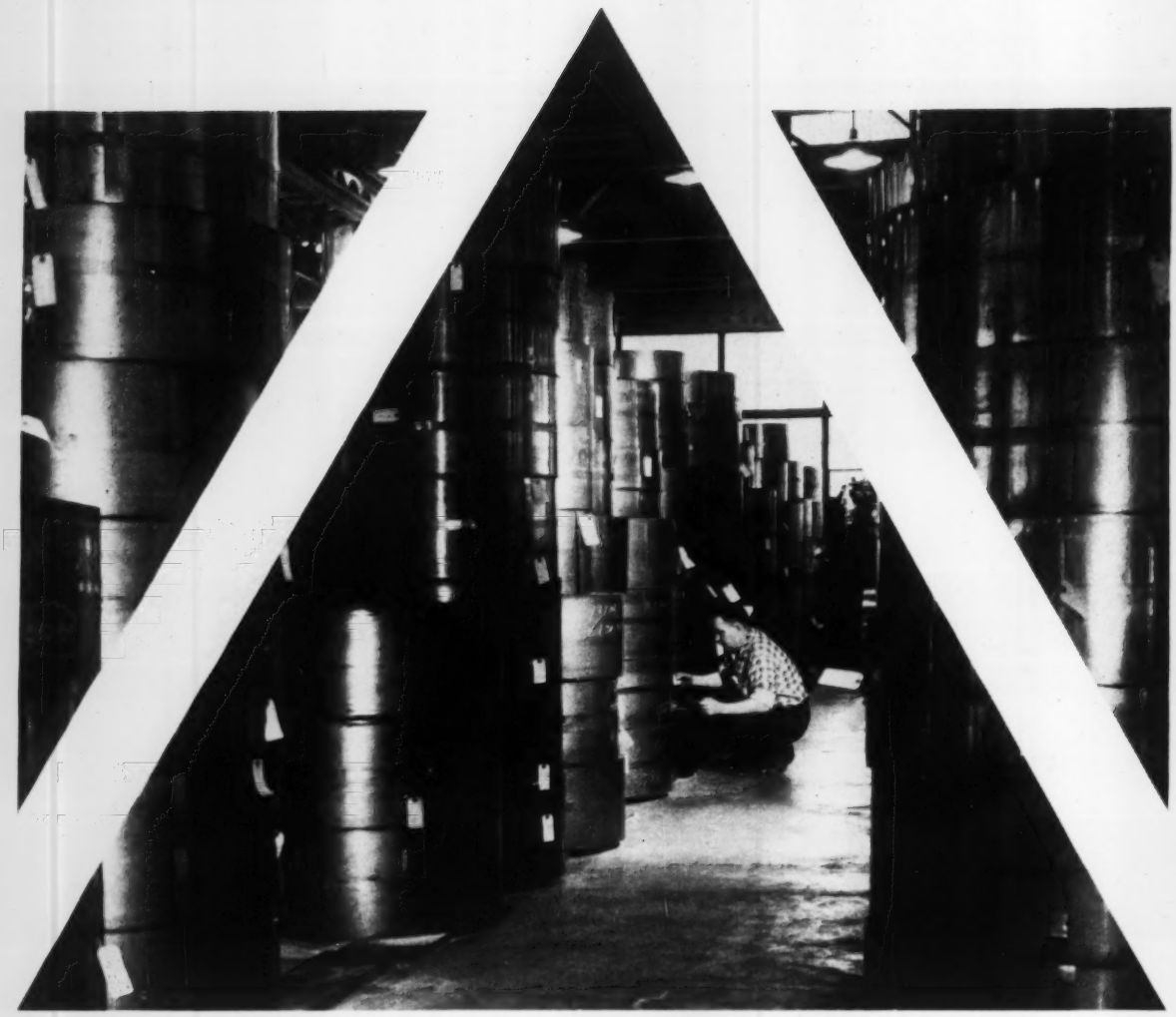
TO FIND THE MAN YOU NEED . . .

Place an advertisement in the "Help Wanted" columns of STEEL's classified pages. Your advertisement will reach the qualified men you need, because STEEL is addressed to highly-trained men in all phases of metalworking

STEEL
The Metalworking Weekly



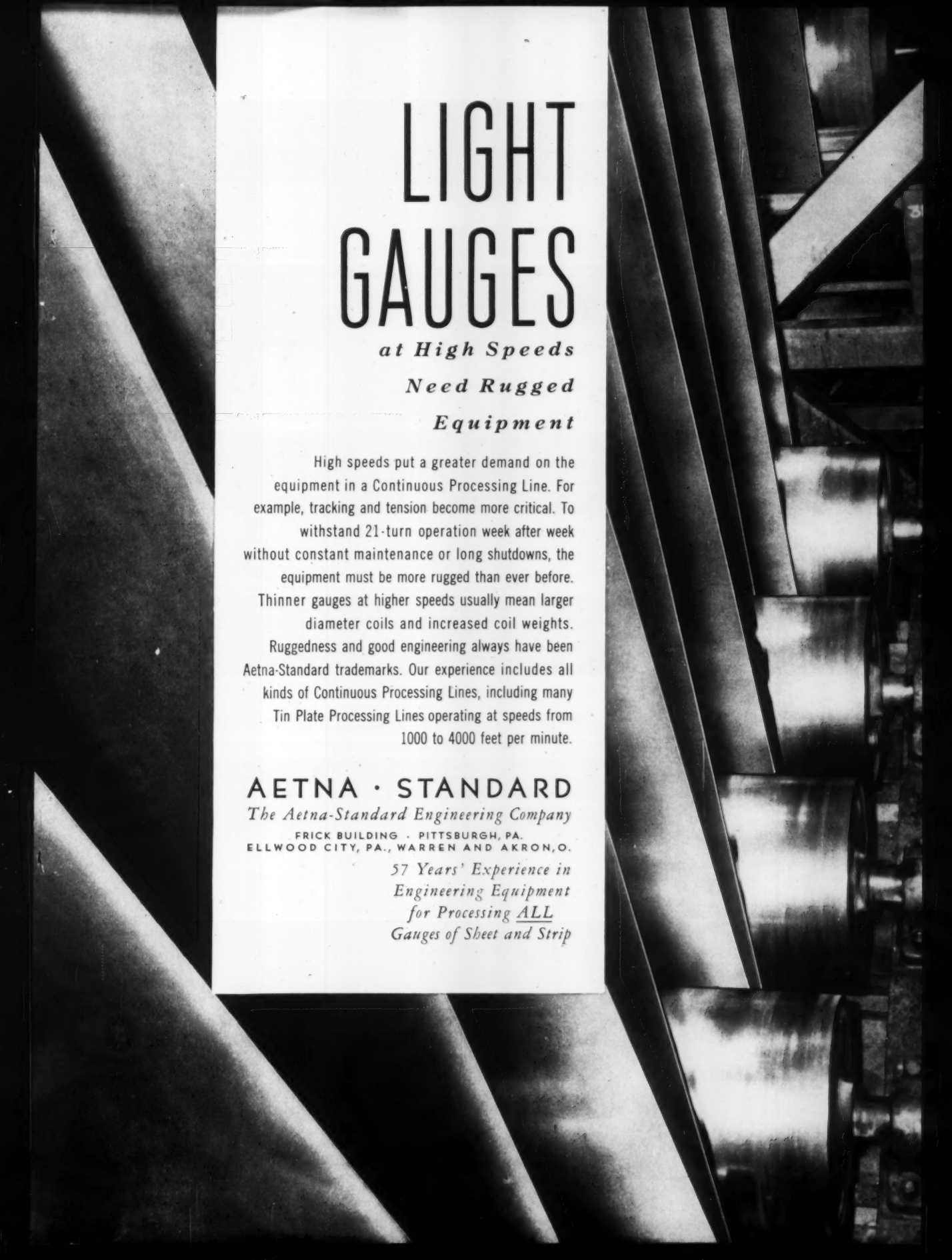
Right Down Your Spring-Steel Alley

The spring steel you need may be sitting in our mill—ready to ship from stock or to roll, slit, heat-treat and finish to your specifications—but fast. Strip steels in widths up to 6½" tempered and 13" annealed or hard-rolled. You specify temper, finish, color, edge, forming properties, tolerance, etc. Find out about these "steels of a lifetime." Write for our 4-page folder highlighting products made from Wallace Barnes Spring Steel. Try us on your next requirement.

Wallace Barnes Steel Division

Bristol, Connecticut

Associated Spring Corporation



LIGHT GAUGES

at High Speeds Need Rugged Equipment

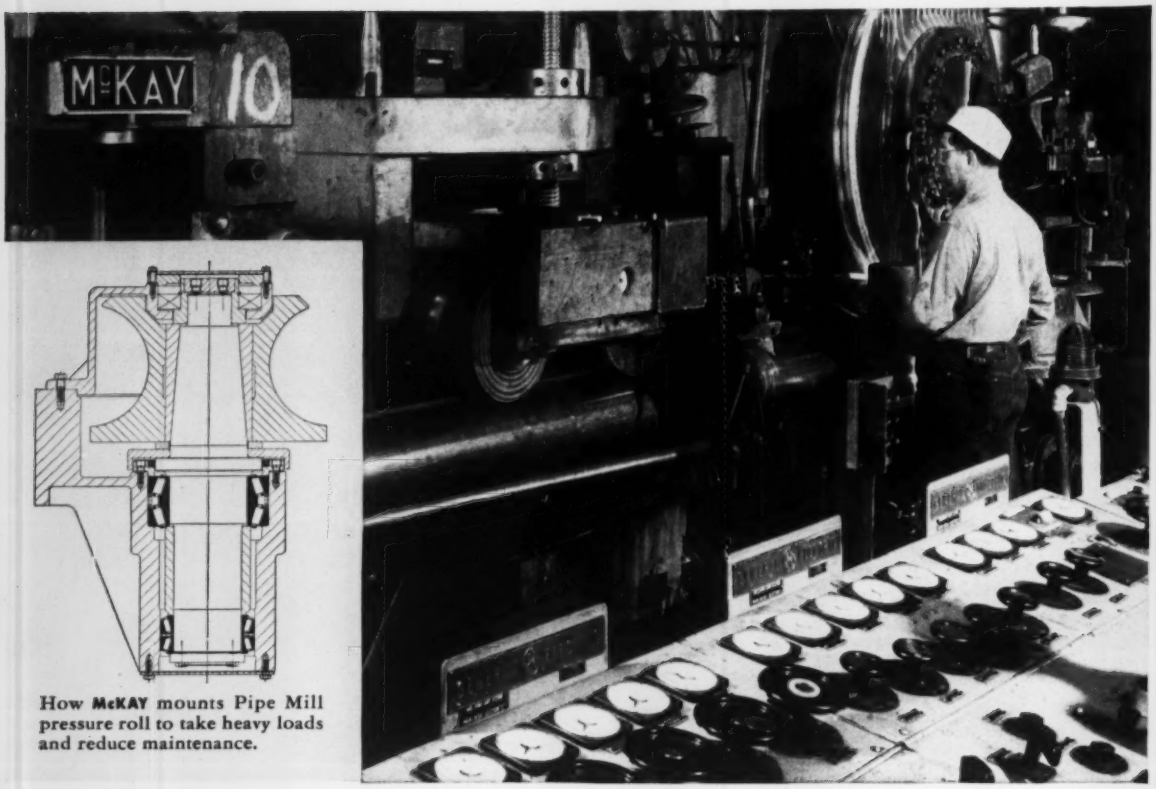
High speeds put a greater demand on the equipment in a Continuous Processing Line. For example, tracking and tension become more critical. To withstand 21-turn operation week after week without constant maintenance or long shutdowns, the equipment must be more rugged than ever before. Thinner gauges at higher speeds usually mean larger diameter coils and increased coil weights. Ruggedness and good engineering always have been Aetna-Standard trademarks. Our experience includes all kinds of Continuous Processing Lines, including many Tin Plate Processing Lines operating at speeds from 1000 to 4000 feet per minute.

AETNA · STANDARD

The Aetna-Standard Engineering Company

FRICK BUILDING · PITTSBURGH, PA.
ELLWOOD CITY, PA., WARREN AND AKRON, O.

57 Years' Experience in Engineering Equipment for Processing ALL Gauges of Sheet and Strip



How **McKAY** mounts Pipe Mill pressure roll to take heavy loads and reduce maintenance.

TIMKEN® bearings take heavy loads on McKay 12¾" pipe mill at J & L

ROLLING out 120 feet-a-minute of 12¾" OD electriweld pipe, an advanced design McKay Pipe Mill is setting new production records at Jones & Laughlin, Aliquippa, Pennsylvania.

To get this, engineers mounted five Timken® tapered roller bearings on the pressure roll shafts and at other vital points. They take the heavy shock loads as pressure rolls upset the pipe edges during the welding operation. These same bearings must take the terrific sizing loads which are present when any cold pipe comes through the welding pass.

Timken bearings' rollers and races are case-carburized to produce hard, wear-resistant surfaces over tough, shock-resistant cores that add longer life to bearings and machine, smooth the way for minimum down time and record production.

The smoke and spatter of welding operations make tight closures a *must.* Timken bearings hold shafts concentric with their housings, keep dust and dirt *out,* lubricant *in.* Maintenance, of course, stays *down.*

Timken bearings take all the stresses in stride because they take both radial and thrust loads, or any combination of loads. They roll the load. Friction is virtually eliminated because Timken bearings are designed by geometric law to have true rolling motion. And they're precision manufactured to live up to their design.

Timken bearings help put go and life in your machines—to make better products, make bigger profits. That's BETTER-ness. Specify Timken bearings. They're at the hub of BETTER-ness. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable: "TIMROSCO".

This symbol on a product means its bearings are the best.

BETTER-ness rolls on **TIMKEN**® tapered roller bearings